

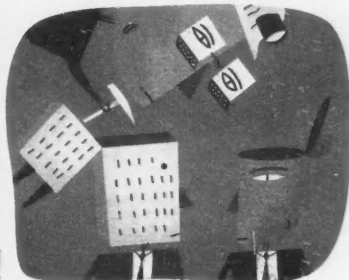
COMPUTERWORLD

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APRIL 14, 2003 • VOL. 37 • NO. 15 • \$5/COPY

KNOWLEDGE CENTER DATA MANAGEMENT

Mining for Gems

SPECIAL
REPORT

Business-intelligence tools can uncover valuable insights about your business — even predict what customers will do next. But be careful that those data jewels don't fall into the wrong hands. **Stories begin on page 25.**

ONLINE EXCLUSIVE

Management dashboards move down into the cubicles.

QuickLink 37401
www.computerworld.com

IBM Begins to Plot Integration Of Rational Tools

Says it's working on a road map for the \$2.1B acquisition; products may arrive later this year

BY CAROL SLIWA
NEW ORLEANS

Developers hoping to hear IBM convey definitive plans for its new Rational tool line may have been disappointed at last week's developerWorks Live conference here.

But through interviews, IBM executives began to provide more details about its plans for Rational Software Corp., which it acquired for \$2.1 billion in February.

Steve Mills, senior vice president of IBM's Software Group, said his application integration and middleware unit is working with the Rational team on a road map. Customers can expect announcements and possibly some integrated product deliveries beginning later

INSIDE: ONE ON ONE

IBM Software Group's Steve Mills scans the competitive landscape. Page 16

this year, with more expansive product rollouts starting next year, Mills said.

Several users said the integration of the companies' product lines, particularly the Rational XDE modeling tool that some of them already use and IBM's WebSphere Studio Application Developer, will be of key importance to them.

"We're pretty happy with WebSphere Studio Application Developer, but if they could add the [Rational] modeling pieces, that's a plus," said

IBM/Rational, page 16

Finance Law May Force IT System Overhauls

Companies brace for full impact of new federal reporting regs

BY GARY H. ANTHES

The Sarbanes-Oxley Act, the U.S. government's attempt to bring honesty, clarity and speed to corporate financial reporting, may ultimately require costly overhauls of budgeting, reporting and decision-support systems.

But much remains unclear about the potential impact of the law, which was passed last

summer. Even companies whose systems appear to comply with the act are uncertain as to exactly what some provisions mean and when they must comply with the requirements, according to recent interviews with IT and business executives.

The uncertainty stems from the fact that the Securities and Exchange Commission is still fleshing out the details of the law through a series of proposed rules. Moreover, the SEC has delegated some regulatory tasks to other organiza-

tions, such as stock exchanges, and they have yet to act.

But the combined weight of Sarbanes-Oxley and other new regulations is expected to result in major systems changes

Finance Law, page 57

THE FUTURE OF NetWare

SPECIAL
NEWS
REPORT

When Novell rolls out the public beta of NetWare 6.5 at its BrainShare user conference this week, the NetWare faithful will cheer. But as the once-dominant network operating system continues to slide into the OS periphery, users need to consider how far it is from oblivion.

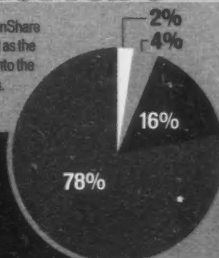
MATT HAMBLIN REPORTS ON PAGE 8.

IN DENIAL?

NetWare loyalists refuse to believe the NOS faces its demise:

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- MORE THAN 2 YEARS
- AS LONG AS POSSIBLE



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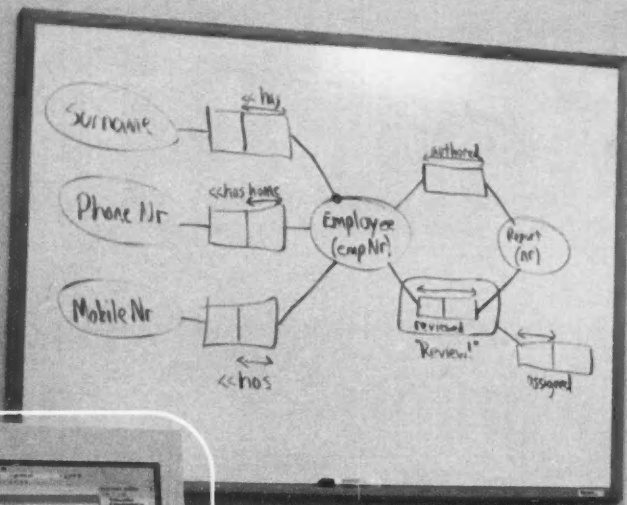
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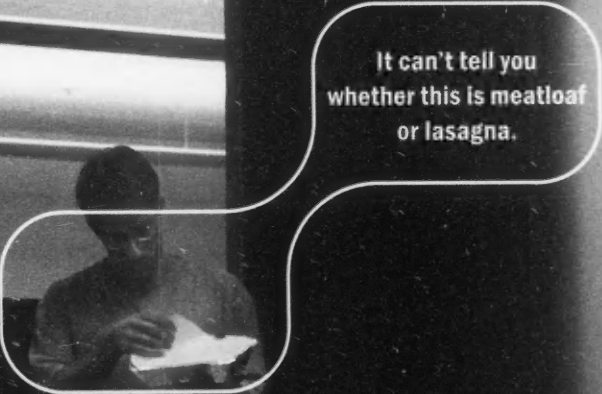
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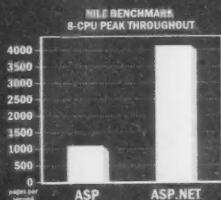


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- 10 **Sun plans to make its Trusted Solaris technology part of the next Solaris release, due out next year.**
- 12 **Intrusion-prevention products** promise to help users go on the offensive against security threats.
- 14 **Application upgrades** that are in the works are designed to provide users with a better view of their supply chain operations.
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ONLINE

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On some pages in this issue, you'll see a QuickLink code pointing to additional, related content on our Web site. Just enter that code into our QuickLink box, which you'll see at the top of each page on our site.

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KNOWLEDGE CENTER DATA MANAGEMENT

Mining for Gems

Many executives seem content to manage their businesses by gut feelings, even though valuable truths about their customers, costs and profits are sitting unexplored in their data warehouses.

This report will help you discover and protect your company's most valuable data assets.
PACKAGE BEGINS ON PAGE 25.

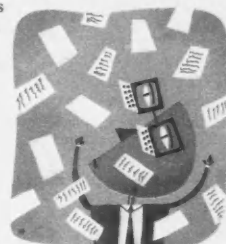
26 The Story So Far. William H. Inmon, the father of data warehousing, describes the genesis of the concept, the challenge of integrating data from legacy systems and what he's working on now.

31 The Forecast Is Clear. Predictive analytics use data mining and tools like regression and neural networks to predict customer behavior and other things. The mathematics can be daunting, but the tools are getting easier to use. **ONLINE:** A Costa Rican bank uses cost modeling to better understand its operations and figure out, say, whether to add more bank tellers. QuickLink 37114



34 Unexpected Insights. The results of data mining efforts can range from utterly baffling to very useful, with lots of surprises in between. And they often provide the facts that prove or disprove managers' gut feelings. Here's a collection of data mining results that gave businesses new insights about their customers and markets.

36 Opinion: The growing population of data gatekeepers should be as guarded as bouncers and just as selective about who gets in to see your organization's data, says columnist Mark Hall.



38 Too Much of a Good Thing? Real-time data feeds are just an added expense if data quality is poor or the company is unable to actually analyze and act on the incoming data.

40 The Almanac: Users are looking for simple, core functions in their business-intelligence software — not fads. And IT managers are a bit more skeptical than business managers are about the quality of corporate data. These and other insights are in our collection of research and resources.

42 Keys to the Kingdom. How do you keep the valuable and competitive information your company has collected about its customers from walking out the door? The first step is to clearly define who has access to what data.

44 QuickStudy: A primer on data models, the organization of a database that gives meaning and utility to the data inside it.

48 Careers: A roundup of skills, training and salary information for data architects.

52 The Next Chapter: Asked to predict the future of business intelligence, these pundits say that dashboards will be hot, e-mail will be mined for business insights, and middle managers may be out of work. **ONLINE:** Industry visionaries say the future includes, among other things, expectations of instant information. QuickLink 37054



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Management Dashboards Becoming Mainstream

Q&A: Decision-support pioneer John Kopcke says management dashboards are moving from the executive suite down to front-line managers who need specific information.

QuickLink 37401

What Web Services Can Do For Business Intelligence

OPINION: Web services promise to make the job of integrating business-intelligence systems easier, but they won't significantly reduce the overall IT investment needed to build such a system, says one CIO.

QuickLink 37326

Open-Source Database Buying Suggestions

OPINION: From the superspeedy to the feature-rich, several open-source databases are equipped to meet your needs, says columnist Russell C. Pavlicek.

QuickLink 37325

AT DEADLINE

P&G Chooses HP For Outsourcing . . .

Procter & Gamble Co. said it has signed a tentative deal, valued at \$3 billion over 10 years, to outsource most of its IT operations to Hewlett-Packard Co. If finalized, the agreement would end the IT portion of an outsourcing negotiations saga that included aborted contract talks between P&G and two other vendors [QuickLink 34271]. About 1,850 workers will transfer to HP from Cincinnati-based P&G.

. . . And Ericsson Signs Similar Deal

LM Ericsson Telephone Co. also announced plans to outsource IT activities to HP. Stockholm-based Ericsson said it has signed an agreement in principle with HP for a contract covering its worldwide IT operations, except for application development and management. The companies didn't disclose the financial terms of the deal, which they expect to finalize by midyear.

Siebel Asks FBI To Probe Leak

Siebel Systems Inc. said it has asked the FBI to investigate a leak of excerpts from its third-quarter 2002 customer-satisfaction survey showing that some user reviews were less than favorable. The San Mateo, Calif.-based CRM software vendor didn't dispute the authenticity of the leaks but said the information was taken out of context.

CIO Plans to Leave AT&T Wireless

AT&T Wireless Services Inc. in Redmond, Wash., confirmed that CIO Michael Benson submitted his resignation on April 10. A company spokesman said the move wasn't related to planned layoffs, which are expected to include cutbacks in IT.

Programmer Testing Services Get Wary Reception From IT

Some CIOs say exams can't measure key capabilities beyond coding skills

BY THOMAS HOFFMAN

INFORMATION technology executives last week had mixed reactions to the emergence of so-called programmer testing services that can be used to measure and rank the accuracy and technical know-how of both offshore and domestic software developers.

For instance, TopCoder Inc., a Glastonbury, Conn.-based company that hosts weekly online programming competitions, recently rolled out a testing service for corporate IT managers who want to evaluate the skills of current workers, job candidates or employees of IT services firms. Programmers who take one of the 500-plus tests offered by TopCoder can be rated against a database with information about more than 5,000 developers, said Rob Hughes, TopCoder's president and chief operating officer.

Meanwhile, Brainbench Inc., a Chantilly, Va.-based skills testing and certification vendor, last month signed a con-

tract with Wipro Ltd. to provide tests to programmers at the Bangalore, India-based software services firm. Brainbench has about 100,000 results for each of the major programming languages for which it offers tests, said Mike Russiello, the company's president and CEO.

Both Hughes and Russiello said they're increasing efforts to market their testing services to companies. But some IT managers were skeptical about the value of such testing, particularly for dealings with potential offshore programmers.

"I would be wary about using this type of service," said David Dart, CIO at HVB America Inc., a New York-based division of financial services firm HVB Group in Munich, Germany. Dart said he thinks it would be more appropriate for an IT services company to put its programmers through "an independently validated quality-assurance program."

He added that his offshore

programming concerns go deeper than just evaluating programmers' skills.

On previous software development projects that HVB America sent offshore, Dart found that the problems that emerged weren't the result of low-quality coding. Rather, business process and language-barrier issues cropped up, he said.

Seeking Soft Skills

John Radko, chief architect at Gaithersburg, Md.-based Global Exchange Services Inc. (GXS), said he sees the kind of testing services offered by TopCoder and Brainbench as "a great concept." However, Radko added that he doesn't

Testing Techies

	TopCoder	Brainbench
WHAT THEY OFFER	500-plus problem-solving tests for Java, C++ and C# developers	220 IT-related tests, about 20 of which are specific to application programming
WHAT IT COSTS	\$12,500 for a six-month license that lets companies test up to 50 programmers	Starts at \$200 per seat for an annual license that provides unlimited access to tests

Nvidia, a maker of graphics and communications processors in Santa Clara, Calif. But he added that Nvidia officials will have to weigh the potential value of the service against its cost.

Marc Pramuk, an analyst at IDC in Framingham, Mass., said he sees a strong potential market for testing services like TopCoder's and Brainbench's. "With the down economy and high unemployment rates among IT workers, it's a real buyer's market, and [this is] a great way for companies to extend the bench strength of their organizations," he said.

— Thomas Hoffman

Nvidia Weighs TopCoder's Benefits, Cost

Daniel Rohrer, manager of Nvidia Corp.'s DirectXGraphics business unit, has used TopCoder's ratings in an ad hoc way to measure the programming skills of two college students who interned at his company. But Rohrer said he hasn't decided whether it makes sense for Nvidia to pay to use TopCoder's service.

The students are TopCoder members who take part in its weekly programming competitions. After Rohrer saw how well they had scored, he offered jobs

to them and to one other TopCoder member. The offers have yet to be accepted.

Rohrer typically assigns up to eight developers to spend 45 minutes with job candidates to assess their technical acumen. "I'm looking for people who have familiarity with graphics APIs and algorithm experience, and there's no certification for what we do," he said.

Rohrer said the ability to put a potential hire through TopCoder's tests could provide an auxiliary assessment tool for

think GXS, which operates a business-to-business e-commerce network, would make use of the services for hiring developers at its facility in Bangalore.

"We have less difficulty finding people that program well and more difficulty with [hiring] people that can work on geographically distributed, cross-functional teams," Radko said, citing functions such as marketing, engineering and customer service. As a result, it's the latter qualities "and other softer skills that we tend to make hiring decisions on," he noted.

Ron Glickman, CIO at DFS Group Ltd., a San Francisco-based retailer of duty-free goods, said he trusts the working relationship his company has with Cognizant Technology Solutions Corp., a Teaneck, N.J.-based firm that has provided offshore programming services to DFS for the past three years.

"It's their job to constantly maintain the highest possible quality and productivity standards, and I expect them to make investments in tools and services as they see fit," Glickman said. He cited Cognizant's Level 5 certification under the Capability Maturity Model, a rating system developed at Carnegie Mellon University to gauge the maturity of application development processes on a scale of one to five. ■

EMC Fine-tunes Centera Array for Data Retention

Adds technology to aid compliance with new rules

BY LUCAS MEARIAN

EMC Corp. last week announced a specialized version of its Centera fixed-data disk array for financial services firms and other companies that need to comply with new regulations on retaining e-mail and ensuring the authenticity of their earnings statements.

The Centera Compliance Edition array will cost 15% to 20% more than the general-purpose model released last

April, according to EMC. But the company said the new product includes software and hardware features that let IT managers set strict rules for retaining and deleting e-mail messages and other documents, as well as increased security mechanisms for controlling access to records.

Steve Rubinow, chief technology officer at Archipelago LLC, which operates an electronic stock-trading network, said the Chicago-based company's IT department uses optical disks to store data for inspection by the Securities and Exchange Commission and other regulators.

Archipelago doesn't have a data retention policy, other than to "put it on this disk ... and keep it for seven years," Rubinow said. "It would be worth thinking about where [Centera] might fit into our environment, because you can see it has an advantage over what we're doing now." For example, he said, a device like Centera could help automate tasks, reducing the need for IT staffers to manually remove and store optical platters.

Regulatory Push

Centera uses inexpensive Advanced Technology Attachment (ATA) disk drives and

includes software that creates a 27-character identifier for each document or image. A separate file with a new identifier is created when records are updated in transaction systems, preventing earlier versions of the information from being overwritten.

Brad Nisbet, an analyst at IDC in Framingham, Mass., said adoption of storage systems such as Centera is being driven by regulations such as the SEC's rule on electronic-records retention and laws like the Sarbanes-Oxley Act, which requires CEOs to sign off on the accuracy of corporate financial reports. Similar devices are sold by vendors such as Network Appliance Inc. and Storage Technology Corp., but they lack Centera's content-addressing feature.

Nisbet said the most significant new feature in the Centera Compliance Edition is a capability that lets users set automated rules governing how long electronic records have to be retained.

Roy Sanford, vice president of content-addressed storage at EMC in Hopkinton, Mass.,

NEW FEATURES

Centera Compliance Edition

■ **Data-retention policy enforcement tools** that let compliance officers set rules on how long data must be kept.

■ **Electronic "shredding" capabilities** that ensure documents can't be recovered with disk-scanning tools once they're erased.

■ **Application access-control mechanisms** that can be used to safeguard sensitive data from unauthorized end users.

said Centera Compliance Edition stores metadata about each record and uses it to determine whether deletion requests should be honored.

For example, if the array receives a request to delete an archived e-mail message, it first calculates whether the e-mail has reached the end of its regulated life cycle.

The list price for an entry-level Centera Compliance Edition system with 4TB of usable storage space is \$148,000, which adds up to about \$10 per gigabyte more than the cost of the regular version of the array. ■

Hitachi, Cisco Plan Key Rollouts At Storage Networking Show

Will announce NAS, IP switch products

BY LUCAS MEARIAN

Cisco Systems Inc. and Hitachi Data Systems Corp. both plan to use this week's Storage Networking World conference to announce major additions to their storage product lines.

The conference starts today in Phoenix and is co-sponsored by *Computerworld* and the Storage Networking Industry Association. HDS plans to disclose at the conference that it's using Network Appliance Inc.'s FAS900 file server engine in front of its Lightning 9900V storage array to create a high-end network-attached storage (NAS) device. The combined product will be available within the next few weeks, said Phil Townsend, senior director of product marketing at Santa Clara, Calif.-based HDS.

Chicago-based Archipelago LLC, which operates an electronic stock-trading network, uses one of HDS's Lightning 9970 arrays to back up Wintel and Sun Solaris servers on a

storage-area network (SAN). Steve Rubinow, Archipelago's chief technology officer, said the NAS device is of interest to him because it uses proven technology from two industry leaders. But Rubinow added that his storage infrastructure still has room to grow, so he has no immediate plans to buy the NAS products.

Michael Peterson, an analyst at Strategic Research Corp. in Santa Barbara, Calif., said HDS's position as one of

the top vendors of storage devices for SANs should help it as it enters the high-end NAS sector.

"Anything that gives the customer ... a single throat to choke is good in the end," Peterson said, referring to HDS's new ability to supply both SAN and NAS products.

The IP Connection

Cisco is announcing a series of products that use Fibre Channel over IP (FCIP) to transport block-level data via the Internet at Gigabit Ethernet speeds. FCIP, a tunneling technology that began to show

up in products last year, is most often used to connect remote SANs to a central data center for data backup purposes.

Cisco's FCIP products include an upgrade to its SN 5428 storage switch that will let storage administrators link departmental or workgroup SANs. The company will also announce an eight-port line card that can send data via both FCIP and SCSI over IP for its MDS 9000 series of SAN directors and switches, plus Fibre Channel port adapters for its 7200 and 7400 series routers.

Total System Services Inc., a credit card transaction-processing company in Columbus, Ga., is using two Cisco MDS 9216 multilayer fabric switches equipped with the new line cards to provide FCIP connectivity between a pair of IBM FAST500 storage arrays in data centers 17 miles apart. Total System Services is mirroring up to 2TB of data between the arrays, said Selvin Hollingsworth, the company's director of network services.

Hollingsworth said it took just minutes to install the line cards and noted that the technology has worked flawlessly. He said he's considering using it to cobble together storage devices in other data centers around the southeastern U.S. ■

STORAGE DOWNLOAD

For more on this subject, visit our Storage Knowledge Center:

QuickLink k1700
www.computerworld.com

NetApp to Release Nonrewritable Array

Network Appliance this week is expected to announce an upgrade of its NearStore disk array that addresses data-retention compliance issues and is squarely aimed at grabbing sales away from EMC's Centera, according to industry sources.

A spokeswoman for Sunnyvale, Calif.-based NetApp confirmed that it will introduce a new product this week but wouldn't disclose any details.

The sources said NetApp will unveil technology called SnapLock, which will let users partition disk space on NearStore file servers as nonrewritable capacity. Like Centera, SnapLock uses ATA disk drives to store fixed data such as e-mail messages, X-rays and document images. But the sources added that Net-

App won't mimic EMC's approach of assigning a different identifier to each record.

One analyst said that SnapLock will probably sell well in industries such as health care and defense, because it's easy to deploy on existing NearStore arrays. "It does provide the flexibility of having some of the file-server [disk space] locked down and some of it not locked down," said the analyst, who asked not to be identified.

But he added that SnapLock isn't expected to fully meet the SEC's rules on data retention, which require financial services firms to ensure that electronic documents are indexed for retrieval purposes and can be verified as authentic originals.

— Lucas Mearian

NetWare Stalwarts Remain Loyal Despite Dwindling Market Share

Most users want to stay with NOS 'as long as possible'

BY MATT HAMBLÉN

THE THOUSANDS of NetWare faithful meeting this week at Novell Inc.'s annual BrainShare user conference in Salt Lake City will see the latest version of the venerable network operating system as it's released for public beta. And they will no doubt cheer its arrival.

Seventy-nine percent of NetWare users want to upgrade to NetWare 6.5, according to an online poll of 1,042 NetWare users conducted by *Computerworld* last week. And a nearly equal percentage said they expect to stay with NetWare for "as long as possible," despite projections that show NetWare continuing to lose share in the server operating system market.

Many users said that they want a more consolidated, easier-to-use interface for NetWare and that they wish Novell would finally get its marketing act together. But they continued to overwhelm-

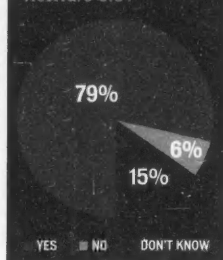
ingly endorse the operating system for its reliability and its lower total cost of ownership compared with competitors' products, the poll found.

"I'd be hurting, personally, if NetWare declines in the next two years," said Doug Boval, systems engineer at St. Vincent Hospital in Indianapolis. "NetWare is awesome, but two to five years from now, it could be snuffed out... with more applications taken off NetWare and moved to Windows or elsewhere."

Stephen Millington, technology manager at North Carolina Mutual Life Insurance Co. in Durham, said Windows isn't as dependable as NetWare for building a networking infrastructure, and therefore NetWare deserves to survive. "I think NetWare will be around for a while, partly because there's no one shoe that fits everybody's needs," Millington said.

Novell officials can't deny the decline but have stressed that they are transforming NetWare from its traditional role as a network operating system to a set of services, such as a continuous backup and server aggregation. They

Does your company plan to upgrade to NetWare 6.5?



SOURCE: ONLINE COMPUTERWORLD SURVEY OF 1,042 NETWARE USERS

have also noted that Novell isn't solely reliant on NetWare, which accounted for \$361 million, or 32%, of the company's 2002 revenue.

"It's no secret that a NetWare market decline is happening, but we're taking measures to resolve that [by] adding a broad range of technologies that have not been there before," said Tracy Thayne, director of solutions marketing at Novell.

Those technologies include open-source software support and the ability to run Java applications natively on a J2EE

server, according to Thayne.

A February forecast by Gartner Inc. projected that the 4% of global server operating system sales that Novell held in 2002 will decline to 1.3% by 2006. Novell introduced NetWare in 1983, long before Windows ran on servers. And by the early 1990s, NetWare had captured 70% of the network operating system market.

Despite its shrinking share, there are still 90 million licensed NetWare users on 4 million servers worldwide. And that base is fiercely loyal.

Brad Staupp, a senior support analyst at Johnson County Community College in Overland Park, Kan., has NetWare running predominantly as a file and print server for 30,000 students and employees. "I thank God every day that we use NetWare," because of its near-immunity to persistent viruses, he said.

"Most definitely NetWare will be around in three years," Staupp said, if only because so many large corporations rely heavily upon it. But he speculated that after that, NetWare could be integrated with products from another vendor, such as Sun Microsystems Inc. "I have confidence in Novell to put money into innovations and to keep NetWare alive," Staupp said.

Boval and Staupp are testing NetWare 6.5 and seeing many improvements over 6.0, including support for more third-party applications and for open-source software useful to their development efforts. But Staupp said 6.5 still needs a single interface running on a single console.

Marketing Missteps

The *Computerworld* survey found that marketing is the No. 1 area NetWare users want Novell to focus on. At last year's BrainShare conference, they roundly criticized the company for its failure to

effectively market NetWare.

The company listened and in January launched a \$30 million campaign of TV, print and online ads, the largest in its history. The target audience is C-level executives rather than front-line IT workers, who typically don't need convincing, Thayne said.

The effort to target senior executives is key, many users said. The University of Iowa expects to migrate from NetWare to Windows servers within two years. But according to systems administrator Kevin Keyser, that decision was made by senior management, not by the people who know and use the product.

"So far, nobody who is a user or works at the administrative level is in a hurry to get off NetWare," Keyser said. "I hate Windows, personally, since we spend our lives nursing it with daily restarts."

"Novell needs to get the mind share of CIOs and CEOs," Keyser said, "just as Microsoft has done by flying top executives to events to sell them." ▀

Research manager Mari Keefe conducted the research for this report.

WISH LIST

Top 10 things NetWare users want from Novell:

- 1 Improve marketing, including to top execs
- 2 Improve administrative/management tools
- 3 Expand Web features
- 4 Support open source, including Linux
- 5 Improve cross-platform integration
- 6 Clarify upgrade path
- 7 Expand directory services
- 8 Maintain stability/reliability
- 9 Expand security features
- 10 Improve installation/ease of use

Begin Looking at Alternatives to NetWare, Analysts Advise

With NetWare experiencing a steady decline in market share, IT managers should face the music and consider an alternative network operating system strategy over the next two to three years, some analysts advise.

"NetWare still has legs, but the decision point about keeping it is two years out," said Earl Perkins, an analyst at Meta Group Inc. in Stamford, Conn. According to Perkins, "no strategy from Novell" will bring in new NetWare customers in appreciable numbers. He said he expects the company to increase annual support costs for the existing user base to make

up for the lack of new customers, putting more pressure on users to find alternatives.

Gartner analyst John Enck advises users to wait and see what Novell has done with NetWare two to three years from now before jumping ship. If a company does decide to migrate away from NetWare, he suggests that it take one of two paths. One is to adopt Windows for file and print functions, especially if a shop already has a Microsoft infrastructure. Otherwise, a shop should consider a combination of network-attached storage (NAS) and print devices, with the NAS

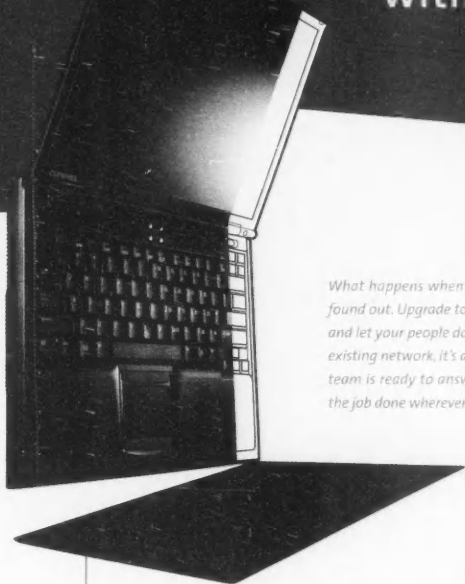
devices supporting Windows, Unix or Macintosh clients.

Migrating away from NetWare doesn't mean dropping other Novell products, such as ZENworks, eDirectory and DirXML. Enck added, noting that these work well in other environments. But not everyone is convinced that the writing is on the wall.

James Taylor, a NetWare consultant at East Cobb Group Inc. in Marietta, Ga., said he believes Novell "will keep NetWare going" for five years at least, so users need not worry about making more immediate migration plans.

—Matt Hamblén

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BRIEFS

Microsoft Supports AMD's 64-bit Chips

Microsoft Corp. said it's developing native 64-bit versions of Windows XP and Windows Server 2003 that will support systems based on Advanced Micro Devices Inc.'s upcoming Opteron and Athlon 64 microprocessors. The 64-bit operating system releases are being designed for use on servers and high-end desktops, Microsoft said.

Siebel Says Q1 Was Below Plan . . .

Siebel Systems Inc. joined the list of software vendors warning that their first-quarter financial results will be lower than expected. San Mateo, Calif.-based Siebel said it now expects to report a profit of up to \$5 million on revenue of about \$335 million. The company said it was on track to meet its sales goals until "a few" purchases were postponed late in the quarter.

. . . But EMC, NCR Top Their Goals

On the flip side, EMC Corp. and NCR Corp. both said their first-quarter numbers will exceed projections. Hopkinton, Mass.-based EMC said its revenue will be within the predicted range of \$1.35 billion to \$1.4 billion, but it noted that profits should be slightly better than expected. Dayton, Ohio-based NCR said it will report a smaller-than-expected loss on revenue of about \$1.23 billion.

Short Takes

ELECTRONIC DATA SYSTEMS CORP. in Plano, Texas, said it won a contract to take over the management of most IT operations for the city of Anaheim, Calif. Terms of the deal weren't disclosed. . . . GATEWAY INC. in Poway, Calif., introduced a pair of rack-mounted Windows servers based on Intel Corp.'s Xeon chips.

Intrusion Prevention Touted Over Detection

Products promise proactive security defense but still need time to mature

BY JAIKUMAR VIJAYAN

THIS WEEK'S RSA Conference 2003 in San Francisco will feature a range of security technologies meant to let corporations more proactively defend themselves against a growing array of cyberthreats.

Unlike most traditional firewall and intrusion-detection products, which passively detect problems, the new tools use rules, usage models and correlation engines to enforce authorized network behavior. In some cases, these tools automatically prevent unauthorized or malicious tasks from executing.

But many of the technologies are still in their infancy, are largely untested in enterprise environments and may not deliver all of the promised functionality just yet, users and analysts cautioned.

Rules-based Protection

One of the vendors touting such products at this week's conference, sponsored by Bedford, Mass.-based RSA Security Inc., is Entercept Security Technologies Inc. The San Jose-based company will release an updated version of a host-based intrusion-prevention software tool that uses virus signature information and behavioral rules to intercept suspicious activity before it accesses an application.

For example, if a rule states that only Web server processes can access Web files, all attempts by other processes to do so will be automatically blocked by Entercept software, company officials said.

RSA announced on April 4 that it would acquire Entercept for \$120 million in cash, and on April 11 it said it would buy San Jose-based Intruvirt

Networks Inc. for \$100 million [QuickLink 37579].

Entercept's technology recently helped Arlington County, Va., protect its core databases from being corrupted by the Slammer worm and has contributed to a more proactive security posture, said Vivek Kundra, the county's director of infrastructure technologies. "Historically, we would learn of an attack only after it happened, and we would react to it. Now we are in a position to prevent some of it as well," he said.

Also this week, Teros Inc. in Sunnyvale, Calif., will add a new module called SafeIdentify to its Teros 100 Application Protection System. Teros 100 is an "in-line" hardware device that sits directly on the network in front of a Web application server and inspects every packet going in and out of the server in real time.

Like other intrusion-prevention products, Teros' blocks anything that deviates from predetermined norms for a particular server or application. While Teros claims that its product can determine what those norms should be, companies that are unwilling to leave that decision to the

Historically, we would learn of an attack only after it happened, and we would react to it. Now we are in a position to prevent some of it as well.

VIVEK KUNDRA, DIRECTOR OF INFRASTRUCTURE TECHNOLOGIES, ARLINGTON COUNTY, VA.

AT A GLANCE

Intrusion-Prevention Products

Typically use policies or usage-based information to model acceptable behavior on networks.

Limit all activities that fall outside such behavior.

Can be deployed either at the application server level or on networks.

Complement existing firewall and IDS technologies.

technology can specify them.

Baker Hill Corp., a Carmel, Ind.-based provider of application services for the banking industry, has placed such "default deny" application firewalls in front of several Microsoft Internet Information Servers, said Eric Beasley, a senior network administrator at Baker Hill.

Among other benefits, the technology has eliminated the need for Baker Hill to immediately patch its servers every time a Microsoft vulnerability is discovered, Beasley said. Since the Teros firewall is designed to allow only a very limited set of activities on the servers it protects, any malicious activities triggered by viruses like Slammer are automatically stopped, he said.

Traditional firewall technologies aren't equipped to stop attacks that come through commonly used ports such as Port 80, said Raj Dhingra, a vice president at Intruvirt, a provider of intrusion-detection systems (IDS).

The company this week will announce IntruShield 1.5, a hardware appliance that sits on corporate networks and sifts through the contents of each packet looking for problems. The technology is able

to modify, drop or block individual packets or entire sessions if needed, company officials said. It can also modify firewall policies while an attack is happening or provide real-time alerts for manual follow-up, they said.

The product has resulted in more accurate and real-time reporting of vulnerabilities, said Andrew Berkuta, manager of network and physical security at HomeBanc Mortgage Corp., an Atlanta-based mortgage lender.

"Originally we were more in the 'detect and tell us' mode," said Berkuta. IntruShield "understands the traffic flow and gets into more of a dynamic prevention" mode, he said.

But Kundra and other users offered several caveats.

For one thing, the tools have to mature so that they're able to consistently block malicious activity without interfering with legitimate traffic. Currently, companies often have to fine-tune and extensively customize such products to prevent that problem, Kundra said.

IDS devices have long been notorious for generating false positives, and there's little to show that the new tools are much better, said Ted Julian, president of Arbor Networks Inc., a vendor of network anomaly detection products in Lexington, Mass. For automatic prevention to become a reality, "the need for better filtering and detection methods is patently obvious," he said.

Such devices could also be single points of failure for companies that rely too heavily on them. Baker Hill, for instance, is investing in load-balancing technologies to spread the load flowing into its Teros systems. The company plans to install standby servers in case its primary systems fail, Beasley said. ■

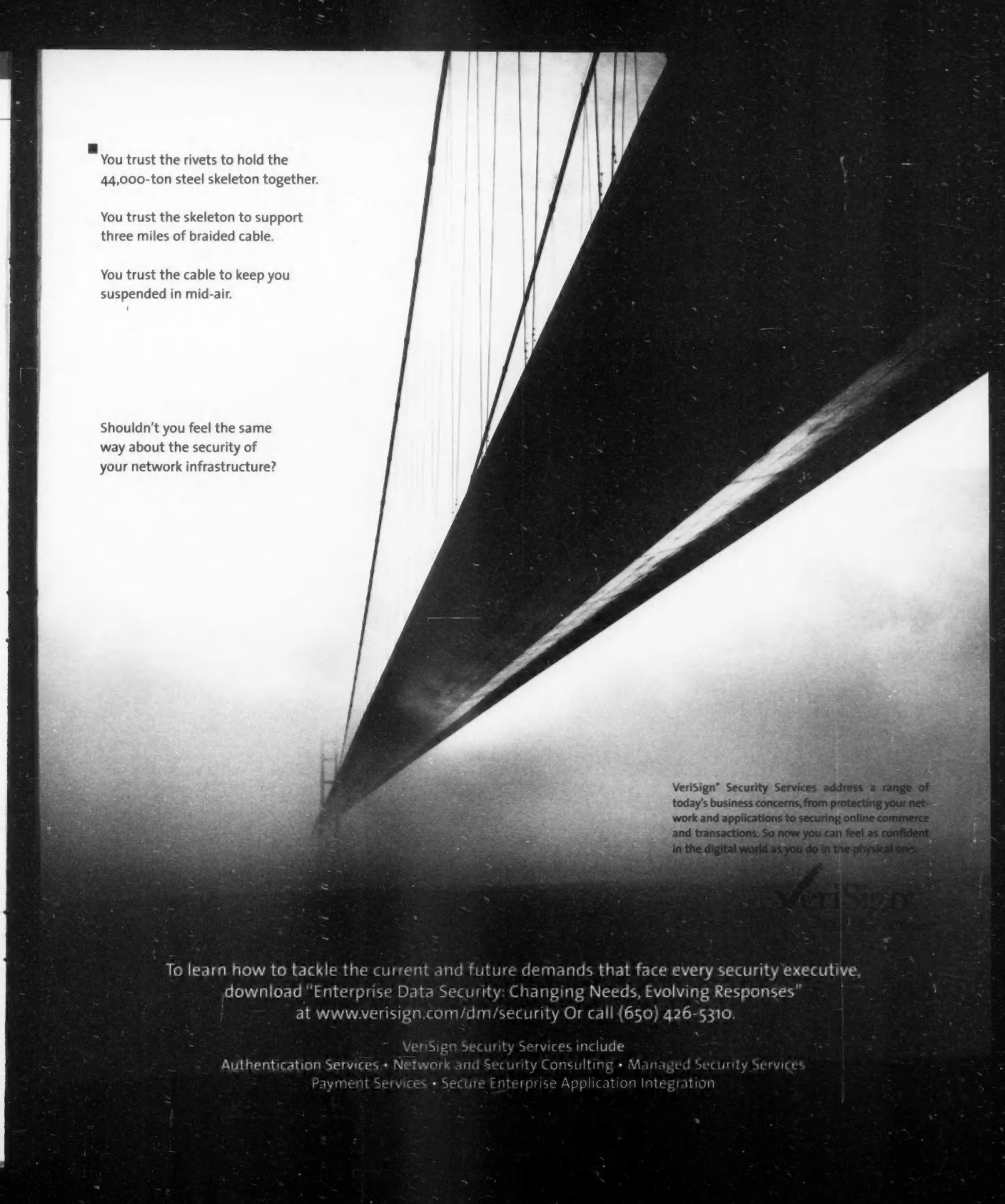
COMPLIANCE TOOLS

New security management software aims to make it easier for companies to ensure compliance with policies.

QuickLink 37707

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Supply Chain Vendors Vying to Provide More Inventory Visibility

Upgraded apps will offer real-time insights, automated response tools

BY MARC L. SONGINI

RIVAL VENDORS of supply chain management software are racing to develop tools that give users additional collaboration capabilities and real-time visibility of product inventory and demand levels.

For instance, Manugistics Group Inc. later this year plans to roll out an applications upgrade that will use Web services hooks to create a "glass pipeline" into supply chains for users, said Lori Mitchell-Keller, senior vice president of market strategy at the Rockville, Md.-based company.

The software will take real-time feeds from Manugistics' supply chain planning and scheduling tools, as well as from third-party ERP systems and other business applications, Mitchell-Keller said. It will also let users set rules for

automated resolution of unforeseen supply chain problems and provide additional forecasting, scheduling and collaboration capabilities.

Manugistics expects to beta-test the software in August and release it by September as Version 7.1 of its applications, Mitchell-Keller said.

What's New?

Chain Visibility:

BOTH MANUGISTICS AND BAAN are developing software that can automatically respond to supply chain problems.

SAP plans to use its NetWeaver integration technology to connect supply chain systems to other applications.

i2 has built new data extraction, event management and information workflow design tools into its software.

The upcoming applications sound similar to dashboard-style products that other vendors like SAP AG and PeopleSoft Inc. are rolling out, said Jeri Dunn, CIO at Tyson Foods Inc. in Springdale, Ark.

Tyson is installing Manugistics' supply chain planning software in its chicken-processing businesses. But Dunn said she has yet to evaluate the features of Version 7.1.

Manugistics isn't alone in targeting increased collaboration and supply chain visibility. SAP in the third quarter plans to beef up the real-time visibility capabilities in its supply chain applications by shipping an upgrade that exploits its new NetWeaver integration technology, said Christian Knoll, the company's global vice president of supply chain management products.

Knoll said NetWeaver will let both SAP and third-party software more easily share data to connect product life-cycle management, CRM and

other corporate systems to supply chain applications.

Dallas-based i2 Technologies Inc. last month released an i2 Six upgrade that includes added extraction capabilities for pulling data out of various systems, as well as enhanced event management capabilities designed to give users real-time views of their supply chains [QuickLink 37218].

In addition, Barnevelde,

Netherlands-based Baan Co. said it's prototyping an advanced planning tool that can automate responses to production scheduling snafus or other problems. Baan is also developing another application that will let supply chain managers execute a collaborative process in real time.

Almost every supply chain vendor is starting to offer inventory monitoring capabilities and other real-time visibility functions, said Karen Peterson, an analyst at Gartner Inc. in Stamford, Conn. But most of the products are still in the initial stages of maturity, Peterson said. ■

Lawson Adds Outsourcing Services - With Help

Vendor relies on partners to host, manage systems

BY MARC L. SONGINI

Lawson Software Inc., which is trying to rebound from three straight quarterly losses, hopes to entice new users by working with two other companies to offer outsourcing services for its business applications.

Lawson will announce the plan this week at its annual user conference in Orlando, where the company also plans to showcase the latest additions to its software.

Sam Adams, senior vice president of global sales at St. Paul, Minn.-based Lawson, said the move to offer hosted applications is largely targeted at midsized and large users.

New Outsourcer

Lawson will handle sales and then hand off users to Velocity Outsourcing, a new company set up by Eisner Technology Solutions LLC, a New York-based systems integrator and Lawson business partner.

Velocity will manage the applications and be responsible for meeting the requirements in service-level agreements

with users, Adams said. The software will run on systems at Verizon Information Technologies Inc. in Tampa, Fla.

Lawson could use a boost in sales. The company posted a \$711,000 net loss on revenue of \$78.4 million for its third quarter, which ended Feb. 28. The revenue total was down 34%

from \$118 million in the same quarter a year ago.

Adams down-

played Lawson's fiscal woes, noting that the applications market as a whole is struggling and that the company has \$250 million in reserve.

Janet Hoadley-Redgwell, a vice president at Manulife Financial Corp. in Toronto, said she hasn't seen the full details of Lawson's outsourcing program. But she noted Manulife outsourced its Lawson-based general ledger and accounts payable systems to IBM last April as part of a 10-year deal covering the insurance and financial services firm's IT infrastructure. The company certainly wouldn't alter its existing arrangement, she said.

Hoadley-Redgwell said Manulife officials are watching Lawson's fiscal health. But, like Adams, she said a number of other software companies face similar problems. ■

Crystal Decisions Tightens Analysis Software Bundle

BY MARC L. SONGINI

Crystal Decisions Inc. last week announced an upgraded set of its reporting and data analysis software that's more tightly integrated than earlier releases were.

The Palo Alto, Calif.-based company said its Crystal Enterprise 9 Premium offering expands on a version of the software bundle that was announced in January. The new package includes hyperlinks to make it easier for end users to send data back and forth between the different applications, said James Church, a group product manager at Crystal Decisions.

The company also added

self-help wizard technology and new packaging that should result in lower prices for users, according to Church. But he declined to give any baseline cost savings provided by the bundle, which starts at \$75,000 per processor.

Mark Smith, an analyst at Ventana Research Inc. in Belmont, Calif., said the premium version will let end users do more ad hoc querying and create more sophisticated reports than they could before.

Appetizing Features

Charles Castleberry, assistant director of architecture at Los Angeles-based Fox Filmed Entertainment, a subsidiary of

Fox Entertainment Group Inc., said he's eager for some of the new bundle's capabilities.

"It will certainly make it easier for us to expand into the analysis features of the Crystal product line," Castleberry said. "The more tightly integrated and seamless the tools are, the simpler it will be for us to start taking advantage of hitherto-unused features." Fox Filmed Entertainment currently runs Crystal Enterprise 8.5 to support internal decision-making.

Crystal Decisions also announced Crystal Analysis Professional 9, an upgrade of its stand-alone Web-based analytics reporting application. New features include improved integration with its Crystal Reports software and products like Microsoft's Excel and IBM's DB2 database. ■

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Continued from page 1

IBM/Rational

Ronald Donson, vice president of retail architecture at Wachovia Corp. in Charlotte, N.C. "We're looking for it to blend. I don't want to have to buy the wheels, then the seat covers." "It's nice to have the design patterns at your fingertips — or at your mouse — rather than having to look them up in a book," said Todd Baldwin, an applications engineer at American Family Insurance Group in Madison, Wis. "To see it in a piece of software really opened my eyes up, because it seems like it's going to be easier to use."

Colleague Paula Waite, a software engineering specialist, said American Family has purchased several copies of Rational XDE, and she hopes the integrated Rational XDE/WebSphere tool will be cheaper than the products are now when purchased separately.

Developers can already use Rational XDE within the same interface as WebSphere Application Developer, since Rational did the work to make the XDE tool plug into IBM's Eclipse open-source platform.

But IBM executives said the level of integration will be more extensive in the future. IBM can "drive a very deep level of integration" down into the runtime, Mills said.

Grady Booch, chief scientist in the Rational division, said the sweet spot for integration will be a model-driven architecture leveraging the Unified Modeling Language standard, which provides mechanisms for visualizing different aspects of a system, from the deployment architecture to the component architecture and even database schemas. He said business rules could be written in a graphical way.

"We have that deep semantics inside XDE, and so the opportunity is to get that level of deep integration," he said.

Booch added that "the ultimate would be debugging at the level of graphics." He said graphical models can be tied to the running system, some-

thing Rational already has demonstrated in distributed systems. Booch predicted that that capability will be included in XDE within a year.

Eric Schoor, vice president of marketing at Cupertino, Calif.-based Rational, said he can envision other areas of integration between the Rational tool line and other IBM products, such as the DB2 database server, Lotus collaboration products and Tivoli systems management software.

Schoor noted that the majority of Rational's tools have a relational database as their persistent storage mechanism. "We could use DB2 as the underlying database in many of our tools, which will simplify their management," he said.

The Lotus collaboration technology could be used to help developers team on projects, he said.

There is also an opportunity for Rational to integrate its configuration management wares with Tivoli products to create "a more seamless and automated deployment environment," Schoor said.

"When an application is running, we can leverage the Tivoli monitoring technology to provide information to developers about what's going right and wrong," he said.

But Schoor was quick to add, "These are concepts, not committed plans."

John Meyer, an analyst at Cambridge, Mass.-based Forrester Research Inc., said he's waiting for IBM to fully integrate the product line, from XDE for development to Tivoli for deployment, and to provide direction to the developer community when there are duplicative capabilities in tools. He noted, for example, that

Rationalizing IBM

Opportunities for new products or additions to existing tools include

- **Testing**, especially in the area of profiling.
- **Architectural and design patterns**.
- **Commercial collaboration** for development teams through instant messaging, video-based Web meetings, Web-based repositories or Web-based configuration management.

SOURCE: GRADY BOOCH, CHIEF SCIENTIST IN IBM'S RATIONAL SOFTWARE DIVISION

three tools — Rational XDE, a tool that IBM acquired from Holosoft Inc., and a tool that Rational acquired from NeuVis Inc. — all contain differing levels of business process modeling capabilities.

IBM's Software Chief Scans The Competitive Landscape

BY CAROL SLIWA
NEW ORLEANS

Steve Mills, senior vice president of IBM's Software Group, spoke with Computerworld last week about the software strategies of IBM and its top competitors. Excerpts from the interview follow.

How do you view the future of Unix at IBM?

There are strong indications that the market is moving down the path to shift toward Linux. These things tend to be long-term trends. The existing Unixes are not just going to disappear from the planet. People started predicting the demise of NetWare 10-plus years ago. There's still lots of NetWare out there.

The more important issue is that Linux is following a fairly predictable path toward reaching maturity. As you look at the progression of Linux, at each level, this has become a more scalable product.

Today, people are typically running two ways and four-

ways, but eight-way is certainly possible. If we look out to the end of the year, we're going to see a more significant number of people beginning to look at running seriously on eight-way and even pushing toward 16-way.

As we come around for another rev of Linux a couple of years out, Linux will be in the 16-, 24-way types of SMP systems.

Where is IBM's R&D money being invested for operating systems?

Most of it goes to the mainframe still, for obvious reasons. Most of the world's business runs every day on the mainframe, and that's a life-and-death environment.

What do you think about Hewlett-Packard's strategy to focus exclusively on Intel architecture?

Remember, HP was reaching a point — this is going back to

Lew Platt's tenure — where they were having to think about what the long-term costs were going to be to design and fabricate high-performance microprocessors, which is not an inexpensive business to be in. Lots of science, lots of heavy investment to create the fabrication capability.

[Platt's] conclusion was that HP's best bet was to essentially become an Intel-based processor company.

What do you see in Sun Microsystems' future? They're getting squeezed at every end of the spectrum: from below by

Wintel, Linux on Intel kinds of approaches. Solaris frankly has been the strongest anchor point for the franchise, and Solaris is under siege from Linux. And the Solaris audience has flexible, portable skills. Anything I can do on any one of the



"What they haven't done is rolled out a road map of which tools will merge in the future," Meyer said.

Roger Oberg, director of market management in the Rational division, said XDE is aimed at developers building components, the NeuVis tool is for corporate developers assembling components, and the Holosoft technology is aimed at business managers or operations executives, not the software development team.

"We've got to refine the story so that people understand there are different types of developers, and we have different products for different types," Oberg said. ■

TOTALLY RAD

IBM's Rational division last week previewed a rapid application development tool:

QuickLink 37737
www.computerworld.com

Unixes, I can do on the other Unixes and on Linux. So they're having a hard time maintaining loyalty.

Is Microsoft's high-end Datacenter Server becoming a more credible competitor? Microsoft is a credible competitor. Perception is reality, and people perceive that Microsoft is a company that's serious about being in the enterprise. So they believe they need to look at Microsoft.

It's very different than selling at the departmental level, though. The enterprise-level people generally do much more physical comparison of products. So it's a very different competitive environment than Microsoft is used to.

Our position is: Wheel it in. Bring in your people and your code, and let's have a duel. This is our expertise. They're playing our game. This is American football, not soccer. It's played with pads, and usually at the end of the game, somebody's bleeding. ■

MORE ONLINE

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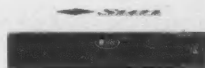


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Unisys Pins Server Hopes on Microsoft

BY PATRICK THIBODEAU

Unisys Corp. last week introduced a midrange version of its ES7000 server [QuickLink

37562] in a bid to broaden the market for that product line, which is based on Intel Corp. processors and the Datacenter

edition of Microsoft Windows. George Gazerwitz, president of the Blue Bell, Pa.-based company's Unisys Systems & Technol-

ogy unit, discussed the ES7000 strategy in an interview prior to the product launch.

Dell and other Intel-based system vendors are pushing clusters for big corporate applications. Why

should users consider the ES7000 over that approach? Certainly, from a performance standpoint, you're always going to get better performance [from a single system], especially when you have demanding applications that drive large databases or transactions. There's a lot less latency, because there are a lot less connections and wires. And from an overall management standpoint, a single-image system vs. a cluster approach is a heck of a lot more efficient to manage and to protect from security infringements.



Q&A

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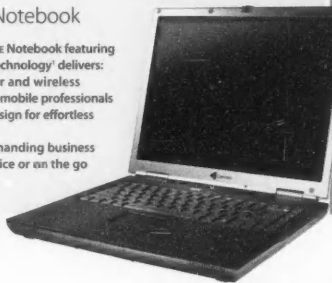
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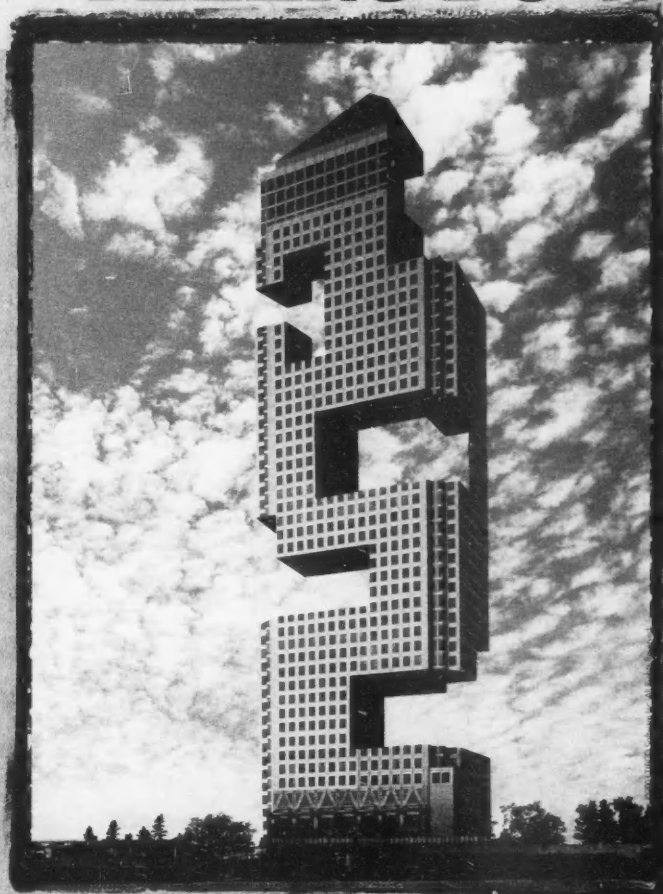
You're closely aligned with Microsoft. Some IT managers worry that standardizing on Microsoft technology throughout their companies and relying too much on one vendor could make them vulnerable. Is that a fear you're going to have to deal with? We've got a great partnership. Are we concerned about it being a single environment? It all comes down to the amount of value that they can continue to add. There's a lot to be said about having a standard environment, and there's a lot to be said about all the applications and solutions that are available to run on that environment.

What market segment are you targeting with the ES7000/500 system? We're still focused on the same markets that we've always been focused on, and that's the high end at the enterprise level. This new product series allows us to get down a little bit lower, [closer] to the midtier, and offer the same mainframe attributes.

Is Unix a shrinking niche market?

I don't think Unix is going to go away. It will shrink a little bit. I think the biggest hit on Unix will probably be with Linux at the low end. The impact at the higher end is going to be the result of Microsoft and the environment that we're talking about here. ■

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PATRICIA KEEFE

Demand Executive ROI

AT LAST, WE ARE STARTING to see shareholders with backbone and more than a modicum of common sense. Two weeks ago, Hewlett-Packard shareholders passed

a nonbinding recommendation asking the company's directors to obtain stockholder approval of large executive severance packages. HP's management, which had lobbied hard against the proposal, issued a terse statement saying that it would "duly consider" the recommendation.

Governing bodies tend to ignore nonbinding referendums, so the shareholders will need the backing of the board. But many boards of directors function as little more than rubber stamps for pay increases or protections sought by the management team. SEC and accounting reforms are supposed to snap these boards to attention, but even among the spectacular ruins of companies such as Tyco International, Enron and Adelphia, we see their boards continuing to go to bat for C-level managers, requesting astronomical salaries, bonuses and severance packages even as creditors line up on one side and laid-off workers struggle to retain their homes on the other.

Those boards and some bankruptcy court judges may have taken leave of their senses, but thankfully, investors are starting to regain theirs. Bids to gain control over executive compensation have either been accepted or are under consideration at companies such as Alcoa, Bank of America, Citigroup, General Electric, Norfolk Southern, Tyco and United Technologies. Various investor groups, including The Conference Board, the Investor Responsibility Research Center, the Pension Rights Center and Institutional Shareholder Services, are starting to press for reform. Even Congress is



PATRICIA KEEFE is a Computerworld editor at large. You can contact her at patrick.keeefe@computerworld.com.

getting warmed up. "It's insulting when they lay off thousands of people and then pay top executives millions of dollars in raises," said an outraged Sen. John McCain (R-Ariz.) recently.

He's right. Executive pay is out of control. The average severance for CEOs at the country's largest companies during 2001 and 2002

was \$16.5 million, according to The Corporate Library. A recent analysis of CEO compensation at the 100 largest U.S. companies by *USA Today* and the Investor Responsibility Research Center found that CEO salaries and bonuses jumped 15% in 2002, while rank-and-file workers averaged only a 3.2% gain. By some estimates, CEOs now make more than 450 times what the average worker earns.

It is insulting when companies richly reward high-level executives who have basically been fired and

then begrudgingly scrape up minimal severance for laid-off workers. If we really believe that much of a company's success rides on the shoulders of the CEO and his team, then the reverse ought to play out. If the company stumbles, then the blame should fall squarely on the executive team. Their parachute strings should be severed, not reinforced with platinum.

Why should you care? Because excessive compensation can undermine the financial strength of the companies you work for and with. It can wreak havoc with service levels and worker morale. What kind of message does it send when your vendor heaps another six- or seven-figure bonus on an already richly compensated executive but announces in a separate press release that, to cut costs, it will whack off another chunk of its service and support division? Or perhaps it expands your sales rep's territory, or charges for or automates a service you would rather it didn't.

High tech — and, by association, IT — has been hit especially hard over the past three years. At a time when ROI is king and cost-cutting is the new Zen, we should demand that these values extend to the executive suite. Leadership starts at the top. ■



PIMM FOX

Stop the Web Conferencing Cost Clash

WEB CONFERENCING is creating a clash that pits departmental prerogatives against corporate cost savings. The departments need to retreat.

Defined as the ability to share documents, applications and even desktops, Web conferencing is a service outside the corporation, offered by the likes of WebEx, PlaceWare and Raindance. But as Web conferencing becomes a general business necessity, the argument that each department should be able to choose its own Web conferencing tool on an ad hoc basis is losing ground.

One reason is cost. At around \$200 per seat per month, hosted Web conferencing can be expensive.

Another reason is technology. The T120 standard used by hosted services (based on P2P networking, and good for a small workgroup) doesn't scale when it comes to offering rich media.

This has left an opening for companies such as Pleasanton, Calif.-based Pixion. Rather than being exclusively a hosted service, Pixion software operates behind the enterprise firewall on Windows servers and integrates with your LDAP settings. Pixion claims that its server can accommodate up to 4,000 unique users concurrently. It uses a capture-frame technology that's recognized by the server, which then discerns who is to get which information or connection. In essence, you have a smart, secure server delivering Web conferencing functions at a cost of \$6,625 for 10 seats per year.

That compares with \$24,000 for an equivalent hosted service.

You'd think that something that much cheaper would be a shoo-in. But the challenge is in persuading marketing, sales, engineering and other departments to give up parts of the budget allocated to their own Web conferencing favorites. That's no easy task.



PIMM FOX is a freelance writer in San Francisco. Contact him at piximfox@pacbell.net.

2003 iForce Partner Excellence Awards



Harnessing the Power of the Internet to Drive Business Advantage

Welcome to the Sun Microsystems 2003 iForceSM Partner Excellence Awards, co-sponsored by Computerworld. The awards recognize U.S. iForce Partners that have excelled in providing innovative, customer-driven solutions and services in areas as varied as decision support systems, supply chain management, product development and communications.

The iForce Initiative is the collaboration of Sun and its partners working with customers as a community to address customer business issues. Through the creation, development and delivery of proven solutions that

can be implemented in less time and with less risk, Sun and its partners enable customers to more quickly realize a return on IT investment.

2003 marks the inaugural year of the iForce Partner Excellence Awards, and we were impressed by both the quantity and quality of the entries. Our independent panel of judges had quite a challenge selecting just one winner per category from the breadth and depth of solutions entered.

We are proud to honor the winners of the 2003 iForce Partner Excellence Awards. To learn more about Sun's iForce Partner Program and offerings, visit www.sun.com/force.

BASIS, Inc.: Most Innovative Solution

As a drug research company that discovers new chemical scaffolds and high-quality leads on promising new drugs, Plexxikon works with massive volumes of highly complex data. Recently, when it sought a highly accessible and interactive system that will scale for years to come, Plexxikon turned to iForce Partner BASIS, Inc., Sun Microsystems, Inc. and Sun Professional ServicesSM for a solution.

Sun, BASIS and Plexxikon worked together to determine that the company needed a grid computing environment that could apply the resources of many networked computers to a single prob-

lem at the same time. The resulting system consists of four tiers: a visualizations tier of powerful workstations; the grid computing layer, which prioritizes resources using the Sun Grid Engine, Enterprise Edition software; a network services tier; and a database services tier running Oracle 8i.

The system is not for the faint of heart - but BASIS and Sun Professional Services engineers worked tirelessly to complete and test the installation ahead of schedule.

The results are impressive. Plexxikon has dramatically lowered its compute time, and therefore costs. For example, tasks that

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used to require a full week are now accomplished in a day. It's safe to say the company that discovers new drugs is glad it discovered BASIS and Sun clustering.

"We required a platform that would accommodate some very demanding computational requirements. The technologies coupled with the expertise of Sun consultants and BASIS offered a significant comfort level."

—Dr. Michael Milburn, Senior Vice-President, Research, Plexxikon

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2003 iForce Partner Excellence Awards



Kirchman Corporation: Best Business Transformation

"The project was a complete success. We've speeded up our end-of-day updates by 30%. That saves a lot of labor costs, on top of the \$100,000-per-year savings we're seeing in maintenance costs and license fees."

—Jim Stock, Senior Vice-President and CIO, Landrum Company

When Landrum Company, a bank holding company, evaluated its operating expenses, executives were struck by the continual increase in the cost of operating software. The bank decided to seek alternatives.

Kirchman Corporation, a Sun iForce Partner, recommended a solu-

tion based on Sun Fire™ V880 servers that allowed Landrum to meet its goals.

In June, Landrum converted its data processing operation to one Sun Fire V880 server, with a second located in an affiliate bank for disaster recovery (the price point of the servers was so



attractive that Landrum eliminated its third-party disaster-recovery provider). Throughout the migration, Kirchman and Sun experts worked side-by-side with Landrum's IT staff to implement each of the company's four banks (in several states) on the same weekend.

The Sun Fire V880 servers are faster than the old mainframe, tapes are a memory and labor savings have pleasantly surprised the company. The project certainly paid dividends for Landrum.

AAL and Dimension Systems: Best iForce Partner Collaboration

"We were really pleased by the way the partners collaborated on the configuration of Sun computers for our student information system, ensuring that when the bell rings and all teachers take attendance simultaneously, response time will be fast."

—Marjorie Mills, Technical Project Manager, Seattle Public Schools

When the public school system in Seattle decided to implement a Student Information System, it demanded a state-of-the-art system with top-notch functionality

as well as easy access. And like many publicly funded groups, the schools faced a budget crunch to boot.

Seattle Public Schools initially leaned toward an NT solution in an effort to standardize on a single technology platform. But two Sun iForce Partners — The Administrative Assistants Ltd. (AAL) and Dimension Systems — teamed up to design a Sun-Oracle-AAL-Dimension Systems solution with fast response time



and maximum reliability and availability. Working within all timing, budget and functional parameters,

the two partners were able to stage, install, integrate and deploy the solution along with Sun Professional Services.

The project was completed two weeks ahead of schedule and is on pace for its full launch in the fall. AAL, Dimension Systems and Sun have earned an A+.



Sybase, Inc.: Best e-Business Solution

As part of the U.S. Department of Transportation, the Bureau of Transportation Statistics (BTS) provides data, analysis and consulting services to myriad federal agencies, universities, the media and the public. Historically, serving so many constituencies made for laborious, time-consuming processes. But by developing a Sybase IQ Multiplex-powered data warehouse, the BTS can now offer its customers fast, accurate, reliable access to data.



Jeff Butler, Assistant Director of the BTS' Office of Statistical Computing, led the team that tackled the challenge. Butler architected a business intelligence solution based on Sybase IQ Multiplex 12.4.3 and new Sun Fire V880 servers from Sun Microsystems.

The solution delivered the ease of use, flexibility and scalability that were demanded by the BTS.

The BTS TranStats business intelligence solution is an unqualified success. It handles over 15,000 Web hits

"The performance of the V880 servers with IQ has been quite impressive. We have a simple, manageable environment that enables IT to meet ever-changing information needs."

—Jeff Butler, BTS

per day and features a searchable index of over 100 databases; selective download capability, which lets users download data using any database or spreadsheet software; comprehensive online documentation; and interactive analytical tools. At BTS, traffic is flowing smoothly.

2003 iForce Partner Excellence Awards



Workscape, Inc.: Best Sun™ ONE Enterprise Software Integration

As one of the world's largest corporations, with hundreds of locations worldwide, General Motors faced a challenge when it sought to create a portal for employees. The portal had to streamline human resources functions, provide 24/7 access, promote a "One Company" culture and foster a sense of corporate community.

The solution: mySocrates, built on Workscape's Employee.com portal running on the Sun Microsystems



Solaris™ Operating System and Sun™ Open Net Environment (Sun ONE) Portal Server software. This solution lets GM customize portal content for individual users' needs, offering each user only the content, services and applications that are appropriate for him or her.

Hosted by Workscape and deployed in only 12 months, mySocrates is already delivering high returns on the investment; it provides anytime-anywhere access for GM's 190,000+ North

American workers. The hosted solution eliminated major infrastructure, software and labor investments, and has reduced mailing costs while providing a high level of self-service in the HR arena.

"mySocrates gives employees the flexibility and technology tools to juggle demands of work and home, along with applications that improve productivity while reducing infrastructure costs."

—Katy Barclay, Vice-President of Global Human Resources, General Motors Corporation

inSolutions: Best Sun™ ONE Collaboration with a Third-Party Software Provider

Nielsen Media Research, the most trusted company of its kind, has created many identity management and security services for its worldwide users. Previous efforts focused on individual applications. They were successful, but none delivered a comprehensive, single solution.

When Nielsen Media Research approached iForce Partner inSolutions, that company took on the challenge and implemented an enterprise security



"This solution lets us handle special identity management issues that are unique to our business as an information service company for the TV media industry."

—Kim Ross, CIO, Nielsen Media Research

gateway based on Sun ONE, Sun Microsystems' architectural solution for Web services.

inSolutions took time to learn the intricacies of the client's business model before addressing technical issues. At the core of the solution is a Sun ONE Directory Server providing directory-based authentication

and authorization. Overall, the system exceeds Nielsen Media Research's expectations, serving as both a security platform and an integration hub for other applications.

Nielsen Media Research projects that the project, currently under development, can save it \$4.9 million. No wonder inSolutions and Sun have earned great ratings.

Dynamic Systems: Best Storage Consolidation Solution

Streamlining and enhancing a storage and server environment is a challenge. So is creating a viable disaster recovery plan. Doing both simultaneously, when budget is a factor, borders on the impossible. But Puget Sound Naval Shipyard (PSNS) recently pulled off this impres-

"Dynamic Systems, working closely with our staff and engineers, upgraded our Sun Microsystems platforms to meet all our objectives at a cost savings of over \$1.2 million."

—Vickie Dill, Project Manager, PSNS

sive feat with help from Sun Microsystems and Sun iForce Partner Dynamic Systems, Inc.

Facing a U.S. Navy mandate to create a disaster recovery plan, PSNS called in Dynamic Systems for an IT needs assessment. The company was able to show PSNS how it could achieve that preparedness and save \$1.2 million.

Dynamic Systems identified a 3-year lease for both hardware and service that allowed the shipyard to use



DYNAMIC SYSTEMS™
We're not just your DASH. We're your business.

its savings for additional Sun hardware and software. The solution also positions PSNS well for the future, as the Sun StorEdge™ 9960 system will handle its future storage growth.

Results have been outstanding. PSNS has its disaster recovery plan — and a 60% performance gain. The shipyard is now considered a model for naval shipyards contemplating disaster plans or storage consolidations. PSNS' ship has truly come in.

2003 iForce Partner Excellence Awards



FusionStorm: Best SunTone™ Certified Service

A leading provider of the infrastructure global financial institutions rely on, CashEdge recently sought to boost its customer support ratings and generate ROI for both the company and its customers. And that ROI had to be based on true business metrics.

CashEdge found the right solution in Remote IT Managed Services from FusionStorm, a Sun iForce Partner. CashEdge was impressed by the way



FusionStorm
Remote IT Managed Services

FusionStorm learned about its business model and needs before suggesting a solution for CashEdge's Sun Microsystems servers.

Jason Braatz, Vice-President of Operations at CashEdge, says FusionStorm's SunTone Certification "makes it clear to our customers that we adhere to the highest standards." CashEdge recouped its investment in only three months. It also cut availability problems 20%, leading to a 30% boost

"For us, Sun Microsystems and FusionStorm have been the difference between being a successful business or not - affecting everything from lowering TCO to reducing time to market. By maintaining our core competencies in-house and outsourcing functions that others can do more efficiently, we can optimize value."

—Jason Braatz, Vice-President of Operations, CashEdge

in customer satisfaction.

Clearly, the Sun-FusionStorm solution gave CashEdge a competitive edge.

Innovative Systems Design, Inc.: Top Sun™ Services Consulting Partner

A longtime Sun iForce Partner, Innovative Systems Design, Inc. specializes in architecting, designing, deploying and monitoring end-to-end high-availability solutions. Its mission: help clients manage their infrastructure more effectively to avoid unnecessary expenditures.

While Innovative Systems Design uses software and services from many

partners, its sole hardware partner is Sun Microsystems. This has created a relationship that brings value to clients, as the company is intimately familiar with Sun's hardware platforms — and knows how to build solutions around them.

Innovative Systems Design has also

developed its own powerful software tools. For example, ITVerify improves IT infrastructure stability by predicting potential outages. The company's

platform technologies in messaging, mobility, storage and software help clients that need to turn data into information.

Innovative Systems Design's client services organization offers integration and deployment support, ensuring complete satisfaction.

"Working together, Innovative Systems and Sun have been able to produce increased mutual financial benefits and high-quality solutions for our customers. Our relationship has been a model for success."

—Jon Caputo, Vice-President, Americas Professional Services, Sun Services

Forsythe Solutions Group, Inc.: Top Sun™ Services Support Partner

Forsythe Solutions Group, Inc. is a leading provider of technology infrastructure solutions. Forsythe helps companies nationwide, many in the Fortune 1,000, build cost-effective IT infrastructure.

The solutions Forsythe provides incorporate best-of-breed technology from Forsythe's strong network of industry-leading provider partners, including Sun Microsystems. As a Sun iForce Partner, Forsythe is a certified specialist in



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"Successful iForce Partners like Forsythe meet the complete needs of their customers by providing not only the hardware and software, but also the integration, leasing and, more important, services. Service delivery provides the margins necessary to remain competitive in this marketplace and also strengthens the bond between customer and partner, forming strategic relationships that last well beyond the hardware sale. Forsythe understands how to maximize this model."

—Darlene Yaplee, Vice-President, Services Sales, Sun Microsystems

available and recoverable Sun solutions, including Sun Fire enterprise servers. As an added value to customers, Forsythe's dedicated Sun maintenance team handles the administration of clients' current Sun

contracts, including consolidation, renewal and addition of equipment to current contracts.

In 2002, Forsythe achieved its thirty-second consecutive year of profitability with revenues estimated at \$627 million.

While I'm not sure Web conferencing should become a C-level management decision, it certainly needs some attention from IT managers.

If document- and application-sharing, Web pages, live annotation and whiteboarding are routine tools for your company's employees, then it's time to move Web conferencing decisions to a higher level. That means confronting corporate fiefdoms that still insist on buying IT a carte.

Of course, other Web conferencing services have value. (WebEx is great for one-to-one sessions, Java-based PlaceWare is fine for one-to-many, and Raintance has supporters who commonly exchange and work on code.) And small or midsize companies may not see significant cost savings in adopting Pixion or its competitors.

But for the chief financial officer hoping to cut costs and for the CIO eager to promote company standardization, it's time to turn Web conferencing over to the enterprise. ■

DAN GILLMOR

Lawmakers Outlaw Firewalls

SINCE MARCH 31, most corporate networks in Michigan have been using illegal technology. No, it wasn't an early April Fools' Day joke pulled off by the Michigan Legislature.

Thanks to the movie industry's paranoia about copyright infringement — plus a clueless group of lawmakers and an inattentive IT community — amendments to a state law called Act 328 have created a mind-boggling slew of limitations on what users of technology may do with what they own.

Here's just one example: Users may not conceal the origin or destination of their communications. Consider the implications.

"If you send or receive your e-mail via an encrypted connection, you're in violation, because the 'To' and 'From' lines of the e-mails are concealed from your ISP by encryption," observes Princeton computer scientist Ed Felten, who broke the news and is keeping close track of the situation on his Web site, www.freedom-to-tinker.com.

"Worse yet," he adds, "Network Ad-

dress Translation (NAT), a technology widely used for enterprise security, operates by translating the 'From' and 'To' fields of Internet packets, thereby concealing the source or destination of each packet and hence violating these bills. Most security 'firewalls' use NAT, so if you use a firewall, you're in violation."

And Michigan isn't alone in this insanity. Similar legislation has been enacted in Delaware, Illinois, Maryland and Virginia, according to the "Washington Internet Daily" newsletter. Measures are pending in several other states, including Massachusetts and Texas.

How could this happen? Credit — or blame — a relentless and reckless copyright cartel that holds copyright enforcement above all else. During the past several years, the Motion Picture Association of America (MPAA) has been quietly lobbying in various states for these laws, now being dubbed "Su-



DAN GILLMOR is technology columnist at the San Jose Mercury News. Contact him at dgillmor@sjmercury.com.

per-DMCAs" — a reference to the federal Digital Millennium Copyright Act. During this time, people fighting for users' rights have focused almost entirely on the federal scene.

An MPAA vice president told CNet's Declan McCullagh that the law is only "an extension of what we've done for years with cable television and phone services at the state level.

It's nothing new. For the life of me, I don't see why anybody would object to that." Gee, maybe somebody who wants to protect the security of his own communications?

Credit the entertainment companies with cleverness, but they've gone too far, as usual. Now watch as the states themselves make this situation worse. State laws are enforced by state prosecutors, who are generally even more clueless on technology matters than federal law enforcement folks.

No one is suggesting that we en-

courage infringement. But the MPAA's "model legislation" (find it on Felten's site) essentially bans even technology that might be used for infringing purposes, as well as information about such technology.

Whoops. There goes security, and research into security, too.

Now that Felten and others have sounded a warning, this bandwagon is slowing. Colorado postponed a vote for a week (it's pending as I write this). Massachusetts legislators seem to be having second thoughts as well.

IT must get involved. Now. Find out what the status of the Super-DMCA is in your state. If it has already passed, tell your legislators that they should undo the damage. If it's pending, scream bloody murder. If it hasn't been introduced, keep your eyes open — because the entertainment cartel never sleeps, even if you do. ■

WANT OUR OPINION?

More columnists and links to archives of previous columns are on our Web site: www.computerworld.com/columns

READERS' LETTERS

Stop Protecting Turf and Share Info

I AGREE WITH the statement in the article "Gartner: Change Management Needed Before Real-Time Data Can Flow" [QuickLink 37350] that business leaders require near real-time critical and financial data to adjust to changing business needs. I also agree that becoming a real-time enterprise will require business leaders to cede control of customer data and other information and share it with other managers and executives. But Gartner analyst Matt Hotle's statement that "programmers like to build; they don't like to reuse" is absurd. To add that IT managers will have to become stricter about enforcing the reuse model and that programmers who don't comply must be "disciplined, beaten or fired" is preposterous. So it's the programmers' fault! We reuse code every day, but we can reuse code only if we know it exists.

How about this for a suggestion: Put the blame where it belongs, on the business leaders. They should tell their business units that they expect them to work together and share their turf, instead of trying to protect it. They should also invite developers to real business meet-

ings so that they can learn the business processes and how they affect other groups. Or they can take the easier route and hire an analyst who will waste thousands of dollars on some useless trip. Now, who should be beaten?

Mike Gempe

Software engineer, Pittsburgh, mike@gempe.com

Get Up to Date

I NOTICED that the front page of the March 24 issue features a picture of an old 8-in. self-propelled howitzer. That's a little like putting a picture of an 8088 on your front cover. It's old news. The U.S. military doesn't use 8-in. cannons anymore. They were replaced by the Paladin 155mm self-propelled gun. Please update your information.

Dan Drass

Network administrator, Garrisonville, Va.

Easy Rollback

THE COMMENT in the story "Getting Started With Linux" [QuickLink 36271] that Red Hat Package Manager (RPM) doesn't support

rollback needs some clarification. Red Hat Update Manager may not be able to, but I have on occasion had to reinstall older packages because of issues in new packages, and the RPM tools are more than capable of reinstalling older versions if the need arises. Because updates are distributed as part of an entirely new package, rolling back to the previous version is easy.

Rodd Clarkson

Software developer, Redfish Bluefish, Ringwood East, Victoria, Australia, rodd@redfishbluefish.com.au

Real Unemployment

A GREAT MANY OF us in IT have experience that says the unemployment rate in the field is closer to 20% than the official national average of all unemployment, currently 5.6%.

Into the wide gap between 20% and 5.6% falls the question of the H-1B program: By what morality, ethics or national priorities can our government possibly justify importing hundreds of thousands of H-1B visa workers for jobs previously held by hundreds of thousands of IT-experienced, currently unemployed citizens of this country? Federal em-

ployment figures come from a national phone poll that is spread too thin (over all occupations and the entire country) to capture data for specific occupations, such as IT. I understand that the poll also misses many long-term unemployed, discouraged searchers, those who have been forced from the occupation by lack of work and necessity, and those who have taken "desperation jobs." I strongly suggest that the top IT publications commission their own statistically valid poll of unemployment among computer and IT workers. I'll bet my last year's salary (ha-ha) that the results will gain a media coup for the publishers.

John C. Napier

Cambridge, Mass.

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KNOWLEDGE CENTER DATA MANAGEMENT

04.14.03

Too Much of a Good Thing?

Real-time data feeds are just an added expense if data quality is poor or the organization is unable to analyze and act on the incoming information. Page 38



The Forecast Is Clear

Predictive analytics use data mining and tools like regression and neural networks to predict customer behavior. BankFinancial Corp.'s William Connerty (at left) is using this technology to hit customers and prospects with more accurately targeted promotions. Page 31

EDITOR'S NOTE

WHAT WOULD HAPPEN if you were to unleash a data mining tool on the contents of this special report on business intelligence? Here are some of the gems it might uncover:

1 Be selective about implementing real-time business intelligence. It sounds great in the boardroom, but pick the mission-critical decisions that actually need split-second data feeds. Real-time data isn't a constitutional right or an across-the-board necessity. Besides, if the data quality is bad, real-time data just means managers can make bad decisions faster.

2 Enforce multilevel access controls for your business-intelligence data. This is a badly neglected area of security, yet business-intelligence data is the company's most valuable asset. What could be more important than the list of your most profitable customers? And what happens if that list falls into the hands of your archrival?


3 Explore the world of "predictive analytics," sophisticated modeling tools that can predict what customers will do next. But, again, you'll need high-quality data, or the predictions won't be any good.

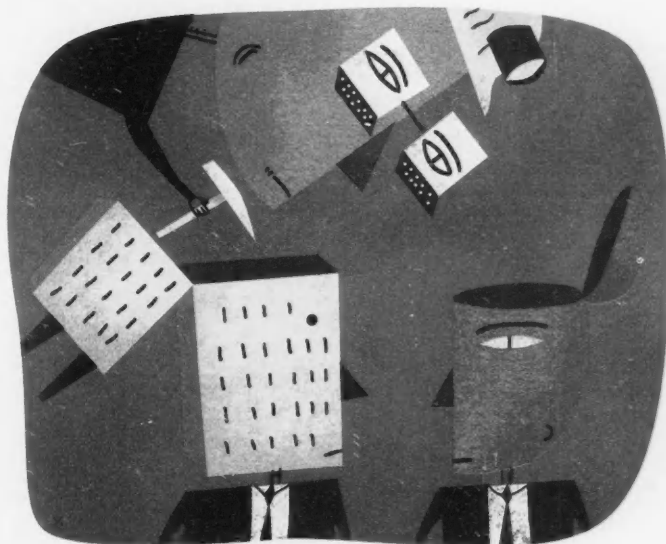
4 Data mining can produce surprising – and surprisingly valuable – results. Sometimes you find out that old assumptions about your business are wrong. Sometimes you find out what customers really want and what's really profitable. I'm amazed that so many executives run huge companies by "gut feelings," when the facts they need to manage intelligently are buried in data warehouses. ■

Mitch Betts is director of Computerworld's Knowledge Centers. He can be contacted at mitch_betts@computerworld.com.

KNOWLEDGE CENTERS ONLINE

More features and resources on this topic:

 QuickLink k1800
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Mining For Gems

**SPECIAL
REPORT**

Business-intelligence tools can uncover hidden truths about your customers and your business.

William H. Inmon is commonly known as the father of data warehousing. While speaking with Frank Hayes, Inmon recalled the development of the data warehouse idea, starting with his 1983 Computerworld article, "What Price Relational?"

"YEARS AGO, the rage was relational technology, DB2 and Oracle. And in healthy skepticism, I wrote a couple of articles saying that while relational technology certainly had merits, it simply wasn't fulfilling everything that was being ascribed to it.

"I got hate mail — people said I should never be allowed to speak in public, that I was setting our industry back 25 years. But I learned from that to ask the question, 'If relational technology isn't the answer, then what is?' And based on the premise that you need to have integrated, historical, easy-to-access information, that was the genesis of data warehousing.

"From that, I started to build data warehouses. My day job was working at American Management Systems, so I was able to try some of my theories out. Some of the early data warehouses we built were very novel and very innovative, and I know I learned a lot.

"The first issue that hit me like a two-by-four was the fact that integrating data from legacy sources is a very nontrivial thing. In the beginning, we thought, 'Well, you've got this source of data over here; you just write a program and you bring the data forward into this data warehouse.' I'll never forget saying, 'Gee, what's so hard about this?' Today, there's a whole industry called ETL [extract, transform and load] that does that.

"The second thing we learned was

The Story So Far

A first-person account from the first person to develop the data warehouse concept.

that the volumes of data that aggregate inside the data warehouse surpassed anything that's ever been seen in the world of transaction processing.

"A third thing is something that the world is still struggling with: How do you cost-justify a data warehouse?"

"I wrote the book [Building the Data

Warehouse] in 1989. Then, all of a sudden, people I'd never heard of started calling me and asking questions. I

started to work with Claudia Imhoff, Sue Osterfelt, Chuck Kelley, some of the early pioneers, doing seminars and conferences and consulting and building data warehouses. It began to take on a life of its own.

"I was surprised about the industrial usage of it. The first data warehouses I did were at PacTel Cellular, Aetna Casualty and Blue Cross/Blue Shield of Michigan, so the early data warehouses were in the telephone and insurance environments. I never thought that manufacturing, transportation, retailing, government — I never

thought data warehouses would be as applicable to those environments as they are.

"It also surprised me that [the] data warehouse forms a foundation for all kinds of analytical processing. We've actually had analytics around for a while: the churn analysis the telephone company does, the elasticity analysis that retailers do. But we're just now starting to see the vendors make things available for widespread usage. Sagent, ProClarity, SAP, PeopleSoft, Cognos and Business Objects all have their own flavors of analytical applications, and I think that's one of the futures for data warehousing.

"Another major issue is that the size of the warehouses is drastically changing things. It's one thing to build a warehouse of 10GB or 20GB; it's another thing to build a data warehouse of terabytes' worth of data. How do you do data management for supersize

warehouses? An index of 100TB of data may take three or four months to build. How long is it going to take to load the data? A week? A month? Six months? The next major

trend is learning how to cope with volumes of data the likes of which haven't even been imagined by most people.

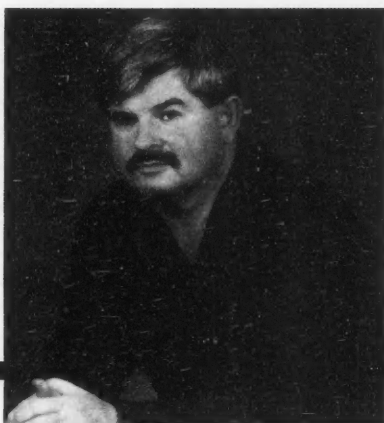
"After Sept. 11, I began to adapt the material I had written for data warehousing into something we call the Government Information Factory. I'm extremely excited about it. There is a lot of really novel and useful information in there, and we're just now starting to talk with and work with government agencies. So that's the direction I'm off on."

And now, on with the story. . . .

HISTORY LESSON

A quick tour of the history of data management is available online:

QuickLink 28502
www.computerworld.com



1961: Charles Bachman at General Electric develops the first database management system, IDS.

1969: Ted Codd invents the relational database.

1983: William H. Inmon begins work on data warehousing concepts. ↑

1985: Procter & Gamble uses the first business-intelligence system to analyze data from checkout-counter scanners. →

1991: Inmon publishes a practical how-to guide, *Building the Data Warehouse*.

1964: Michael S. Scott Morton first describes the concept of decision-support systems. →



1970: Express, a multi-dimensional analytic processing tool for time-sharing systems, becomes available.

1976: Work begins on the Management Information and Decision Support system, an early executive information system, at Lockheed-Georgia Co.

1989: Gartner analyst Howard Dresner coins the term *business intelligence*.



1993: Ted Codd coins the term *OLAP* (online analytical processing). →

ENSURING IT PRIORITIES MATCH CORPORATE OBJECTIVES.



PACIFIC EDGE RAISES THE BAR ON PORTFOLIO MANAGEMENT

Emphasizes the enterprise, helps businesses maximize return on IT investments

INVESTMENT DECISION-MAKING NEW TECHNIQUES, NEW RESULTS



Taking Control

SPECIAL REPORT

Too often viewed as relevant to IT decision-making only, the emerging Enterprise Portfolio Management discipline is, in fact, finding acceptance and delivering benefits in the broader business context.

In the current chilly economic climate, IT is more than ever having to prove its value in business terms. Most organizations have more IT project requests and wish-lists than they have resources to complete, so the process of making choices has become increasingly important. In this environment, the concept of Portfolio Management has come to the forefront as a means of making informed decisions and ensuring maximum return on IT investments.

As a result, Portfolio Management has evolved from a somewhat academic discipline of project analysis and comparison, to a practical technique for aligning IT investments with overall business objectives. And given the real-world return on investment Portfolio Management has been shown to deliver, the approach is rapidly gaining acceptance in executive offices and even boardrooms. Analysts such as META Group are of the opinion that "when consciously pursued, it provides the enterprise (IT organization and lines of business) a disciplined framework to leverage IT management

processes and IT asset investment and deployment decisions."

That Portfolio Management is no longer a niche solution is borne out by a recent META Group survey of 219 organizations from a variety of industries. META reports that 56% have adopted a Portfolio Management approach or plan to adopt one in 2003/2004. More than 40% of respondents plan to use Portfolio Management to aid decision support, and almost 30% plan to adopt it

as an enterprise-wide discipline. Further evidence comes from the types of companies which are adopting Portfolio Management.

A pioneer of the Portfolio Management movement from the start, Bellevue, Washington-based Pacific Edge Software has consistently preached the benefits of the strategic approach to investment evaluation and execution. With an aggressive program of product enhancements, Pacific Edge has consistently upped the ante, becoming the de facto standard when it comes to Portfolio Management solutions.

In a service and information driven economy, IT is evolving from a supporting role – facilitating the "real business" – to center stage: increasingly, IT is the business. As a result, the need to align IT's activities with corporate objectives grows greater, while pressure on spending forces difficult choices to be made.

CONTINUES NEXT PAGE

AT A GLANCE

Portfolio Management does for business investments what a fund manager does for financial investments –

✓ Considers all possible investment opportunities in terms of their contribution to overall business objectives

✓ Weighs costs and rewards using balanced multidimensional prioritization criteria

✓ Builds a portfolio with a mix of investments that will deliver maximum business benefit

✓ Constantly reviews and adjusts the portfolio mix based on performance and changing business needs

This systematic approach increases the likelihood that only the investments that will significantly contribute to sustained business success will be funded and executed.

IT AND BUSINESS STRATEGY

SPECIALFEATURE

BUSINESS FOCUS

What is Enterprise Portfolio Management — and why does it matter?

Rob Dickerson, President & CEO
of Pacific Edge Software

ENTERPRISE PORTFOLIO MANAGEMENT

Enterprise Portfolio Management treats an organization's investments in projects, products, assets, and resources in much the same way as a fund manager treats an investment portfolio. Enterprise Portfolio Management is a continuous process of selecting and managing the optimum set of investments to deliver maximum business value.

With the stress of economic pressures, it is more important than ever for organizations to achieve a competitive advantage by reducing costs, increasing efficiency, optimizing use of resources, and delivering more value while responding to rapidly changing business needs.

Enterprise Portfolio Management is a continuous process of selecting and managing the optimum set of investments to deliver maximum business value.

CORPORATE GOVERNANCE

This "good steward" philosophy also has particular relevance in these times of increasing focus on corporate governance. When objective measures are used to determine which projects get executed, which products get devel-

oped, and which resources can best be deployed in different activities, the decisions made are more likely to be the right ones — and more likely to enjoy consensus and support across the organization.

In essence, Enterprise Portfolio Management provides a closed-loop environment in which the complete inventory of actual and potential investments can be analyzed, planned, and tracked. On top of this framework, best-of-breed Enterprise Portfolio Management solutions also provide:

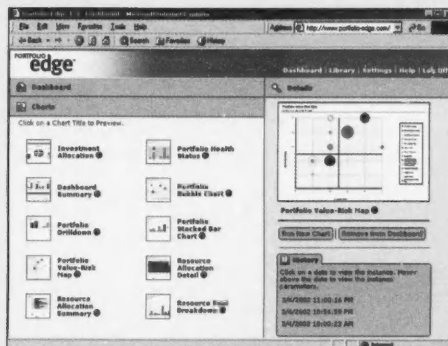
- ✓ Portfolio modeling and reporting facilities which are flexible enough to be configured to meet each organization's unique and changing Portfolio Management process and priorities.
- ✓ Integration functionality, such as XML connectors, which allow portfolio information to be efficiently captured from the organization's existing business systems.
- ✓ Tools and information delivery mechanisms that meet the specific needs of all individuals in the Enterprise Portfolio Management environment.
- ✓ Specialized Enterprise Portfolio Management solutions for specific types of business activity, such as IT and new product development.
- ✓ Proven Enterprise Portfolio Management modeling and best practices expertise.

CONTINUED FROM
PREVIOUS PAGE

Portfolio Management provides an opportunity for IT to be managed like the business it truly is. The IT organization manages its portfolio of activities — from baseline business support to asset renewal and development to high-risk business/IT ventures — in a manner consistent

with the principles of best-in-class business practices. The portfolio is actively managed with a focus on yield, risk, risk-taking, and agility.

This active approach requires information and techniques, and it is these needs which Portfolio Management software — like Portfolio Edge™ and Project Office® from Pacific Edge Software — now fulfills. These products provide a framework for considering investments — and their requirements for money, time, resources, and effort — in a rational, standardized way. The most valuable investments get prioritized for execution, while the others remain in inventory for further development, future review, or re-assessment if the business objectives or competitive environment should change.



The "Bubble Chart" is a favorite with portfolio managers, who find it invaluable for cherry-picking high-value/low-risk investment "gems" — and for steering clear of low-value/high-budget "dogs". The X and Y axes can be selected to display any chosen criteria — here risk vs. value — while the size of the bubble allows a third dimension to be considered. Pacific Edge Software's Enterprise Portfolio Management solution, Portfolio Edge, provides a comprehensive library of charts and reports to meet the needs of all Portfolio Management roles. A template tailored to the specific needs of the IT department is also available.

On this level playing field, investment decisions are faster, more accurate and less influenced by politics. Since reviews take less time, they can be held more frequently — possibly even daily — allowing Portfolio Management to be more responsive to evolving business needs.

For more on the Pacific Edge Portfolio Management solution, call (425) 897-8800 or visit www.pacificedge.com/moreinfo

ENSURING IT PRIORITIES MATCH CORPORATE OBJECTIVES

With its Enterprise Portfolio Management solution, Pacific Edge Software serves up significant business benefits. Here's what it delivers:

- ✓ Facilitates active management of the mix of IT investments, creating a portfolio that maximizes return on the IT dollar
- ✓ Applies a consistent, objective decision-making process to ensure IT efforts are aligned with overall business strategy
- ✓ Delivers improved visibility and accountability for IT investment decisions
- ✓ Allows the entire lifecycle to be considered when estimating and measuring IT investment returns
- ✓ Replaces traditional annual budgeting with a continuous planning process for prioritizing and sequencing
- ✓ Enhances business agility and responsiveness with extensive what-if and scenario planning functionality

Online, In-Depth

The recent META Group White Paper, *IT Investment Management: Portfolio Management Lessons Learned*, provides a more in-depth look at IT Portfolio Management and its benefits. For a complimentary copy and an interactive Web demo, visit www.pacificedge.com/computerworld



ENTERPRISE PORTFOLIO MANAGEMENT

INVESTMENT DECISION-MAKING
NEW TECHNIQUES, NEW RESULTS



Taking Control

SPECIAL REPORT

Although often viewed as a benefit to IT decision-making only, the emerging Enterprise Portfolio Management discipline is, in fact, finding acceptance and delivering benefits in the broader business context.

Questions like these shown here are at the heart of business performance and critical to meeting investors' expectations. But finding the answers to them can be surprisingly challenging. Information on costs and performance is often separate from data on project status and resource utilization – and typically available only after the fact. In fact, simply obtaining an inventory of all the company's assets, resources and project investments may be almost impossible.

Even with a well articulated corporate strategy and sophisticated information systems, managers can find it hard to identify assets which are underperforming, investments which are low-value, or projects which are irrelevant to corporate goals. Even if the information is available, many executives feel there are so many variables, they don't have time to think things through to avoid arbitrary cuts.

Enterprise Portfolio Management goes to the heart of this challenge.

Initially developed to help IT management choose which projects to allocate resources to, Enterprise Portfolio Management has evolved into a powerful tool by which all the enterprise's investments can be

What contribution is each specific investment making to our corporate objectives?

How do the costs and return of an individual investment compare with similar investments?

In what areas should we focus our investments for maximum competitive advantage?

Are we maximizing the return on the intellectual assets generated by our projects, products, assets, and resources?

Do we even have the right mix of investments?

analyzed, prioritized, planned, and managed. In simple terms, Enterprise Portfolio Management views the entire business as a portfolio of assets, resources, and project investments – and provides the information and techniques to manage the portfolio for maximum return.

Enterprise Portfolio Management provides a means of quantifying the rewards and risks of all the enterprise's undertakings. Performance can be measured against these metrics, providing visibility into the risks to investors. A key component of Enterprise Portfolio Management solutions, such as Portfolio Edge from Pacific Edge Software, is a "dashboard" which aggregates the performance of the entire portfolio, allowing the executive team to manage the entire portfolio of corporate investments, assets and resources.

Only with this accurate view of expenditures, resources, schedules, risks, anticipated benefits, and business value, can management effectively maximize ROI on the entire investment portfolio.

For more on Enterprise Portfolio Management and its relevance to senior management, visit www.pacificedge.com/webcast for a complimentary Webcast with CIO of Merck Health Partners.

META Group on Enterprise Portfolio Management

In a recent interview, Marnie Ross, Vice President of Executive Director at META Group, talked about the significance of Enterprise Portfolio Management.

“Selecting the right projects is not only about financial return. Important projects continue to be bypassed in many organizations because investment criteria focus only on financial return on investment (ROI), cost/benefit, or (worse) no predetermined decision factors.

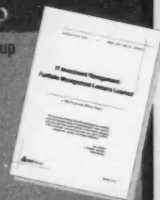
Fewer than 10% [of Global 2000 enterprises] use several levels of criteria (risk, life cycle, return, planning horizon, etc.) to select projects. The remaining companies still rely on a first-come, first-served or squeaky-wheel method of allocating resources to projects.

The key to a winning mix in the investment portfolio is ensuring that capacity to complete projects is balanced with several types of projects. Focusing only on high-return, tactical, or offensive projects frequently satisfies line-of-business goals, but can jeopardize enterprise durability.

Balancing a portfolio to ensure maximum benefit to the business requires consideration of various weighted factors that represent the complexities of the business environment, the capacity and capabilities of the IT organization, and the long-term goals of the company.”

Complimentary White Paper from META Group

Read all that META Group has to say on the relevance of Portfolio Management in the White Paper, *Portfolio Management Lessons Learned*. For your complimentary copy and an interactive Web demo, visit www.pacificedge.com/computerworld



PORTFOLIO MANAGEMENT IN ACTION



250 Projects 130 Resources \$15 Million Investment 1 Big Success Story

For Dr. Reagan Ramsower of Baylor University, what started out as a way of prioritizing IT projects has become the key to managing an aggressive 10-year plan for the entire University's future. Today, Baylor is applying the techniques of Enterprise Portfolio Management to shape the extensive and ambitious vision of Baylor President Robert B. Sloan, Jr.

The story begins in November 2000 when Dr. Ramsower became CIO at Baylor. The higher education institution had more than 250 IT projects that represented an investment in excess of \$15 million and involved no fewer than 130 different resources. "Within the first week," says Dr. Ramsower, "I realized an IT Portfolio Management solution would be critical to the success of my division."



Dr. Reagan M. Ramsower

Dr. Ramsower selected an IT Portfolio Management solution from Pacific Edge Software in Bellevue, Washington. "We selected Pacific Edge," says Dr. Ramsower, "because it was effective, easy to use, and provided pre-defined IT templates so that information could be obtained with minimal bureaucratic overhead."

"It was also important to us that the Pacific Edge solution supported project and resource management," he continues. "But it is not another project management tool – it's a way to examine, analyze, and measure our product, project, and asset investments and their alignment with strategic objectives."

Initially, Dr. Ramsower saw IT Portfolio Management only as a means of tackling the complex challenge of prioritizing IT investments. However, he soon understood that this could go much further.

FROM IT TO THE ENTERPRISE – USING ENTERPRISE PORTFOLIO MANAGEMENT FOR STRATEGIC PLANNING

Having developed an ambitious 10-year vision for the University's

future, Baylor President Robert B. Sloan, Jr., charged Dr. Van Gray to apply the same techniques across the entire institution, to provide visibility into all the initiatives proposed in "Vision 2012."

The dramatic growth in scope – from IT to the Enterprise – shows how broadly Enterprise Portfolio Management can be applied. The University is experiencing the same benefits gained in the IT context, but now, across the entire institution. The Pacific Edge Enterprise Portfolio Management solution enhances the strategic planning process, supports

approval and scheduling initiatives, monitors the progress of initiatives, and analyzes the effectiveness of initiatives in achieving their intended strategic outcomes.

Dr. Gray is delighted. "We're taking what the IT division learned and using it to assist the University's Strategic Planning efforts to approve, manage, monitor, and measure the large-scale initiatives required to achieve the president's ten-year vision."



Dr. Van D. Gray

The results: today, Baylor uses Pacific Edge software to filter all proposed vision-related initiatives each year. The project and investments approved and managed with the software currently represent approximately 11 percent of the University's total annual operating budget. This is expected to expand next year to encom-

pass over 700 projects totaling \$110 million or one-third of the University's annual operating budget, with this percentage increasing steadily throughout the implementation of its ten-year vision. "Without the systematic approach to decision-making afforded by the use of Pacific Edge's software,

our risk of mismatching our financial resources to the activities necessary for successful implementation of our vision would be extremely high. The Pacific Edge solution lowers that risk and is a critical component in promoting the achievement of our required investment returns," reports Dr. Gray.

Dr. Reagan M. Ramsower is Associate Vice President, Chief Information Officer, Dean of Libraries, and Professor of Management Information Systems at Baylor University. He is internationally recognized for his pioneering work in 1984 on telecommuting, and has published several books and numerous articles in the journals of information systems.

Dr. Van D. Gray is Associate Vice President for Strategic Planning and Improvement, and Associate Professor of Management at Baylor University's Hankamer School of Business. He is responsible for managing the overall strategic planning process for both the University's academic and administrative units, including development of strategic plans that support Baylor 2012, Baylor's 10-year Vision.

NEXT STEPS

More information on Portfolio Management in the Enterprise can be found online at www.portfolioknowledge.com.

Sign up at the same Web site for a complimentary subscription to **Portfolio Knowledge** magazine.

For more on the Pacific Edge Enterprise Portfolio Management solution, call (425) 897-8800 or visit www.pacifiedge.com/moreinfo

This special feature on Enterprise Portfolio Management was brought to you by Pacific Edge Software, the leading provider of Enterprise Portfolio Management software for global organizations. Pacific Edge delivers closed-loop management solutions that help businesses maximize value and reduce risk in their investment, project, and product portfolios.

Pacific Edge's business-critical solutions include Project Office® and Portfolio Edge™ enterprise software products, professional services, industry-specific templates, and a proven portfolio management process.

To explore how Enterprise Portfolio Management can help you align investment and development activities with business strategy, please contact us at:

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Portfolio Management for Smarter Business™

THE POTENTIAL FOR mining cost-saving and revenue-boosting ideas from data is increasing as companies build bigger data warehouses, applications become more integrated, computers grow more powerful and vendors of analytic software introduce products that are easier to use.

But many companies that have made huge investments in terabyte-size data stores aren't using them effectively to forecast the future — to predict, for example, which customers are likely to leave, which ones will probably respond to the next promotion, which ones are ripe for cross-selling and what will happen to sales if prices are increased by 5%.

While many of the products that can answer those questions use esoteric techniques such as neural networks, logistic regression and support-vector machines, they don't require a Ph.D. in math, users say. Indeed, the biggest stumbling block to using "predictive analytics" is getting the data, not analyzing it, they say.

That has been the case so far at BankFinancial Corp. in Chicago. It uses the Clementine data mining "workbench" from SPSS Inc., also in Chicago, to develop models that predict customer behavior so the bank can, for example, more accurately target promotions to customers and prospects.

The bank uses Clementine's neural network and regression routines for these models. It's also beginning to use PredictiveMarketing, SPSS's new package of "best-practice templates" for helping users set up predictive models.

Models Easy, Data Hard

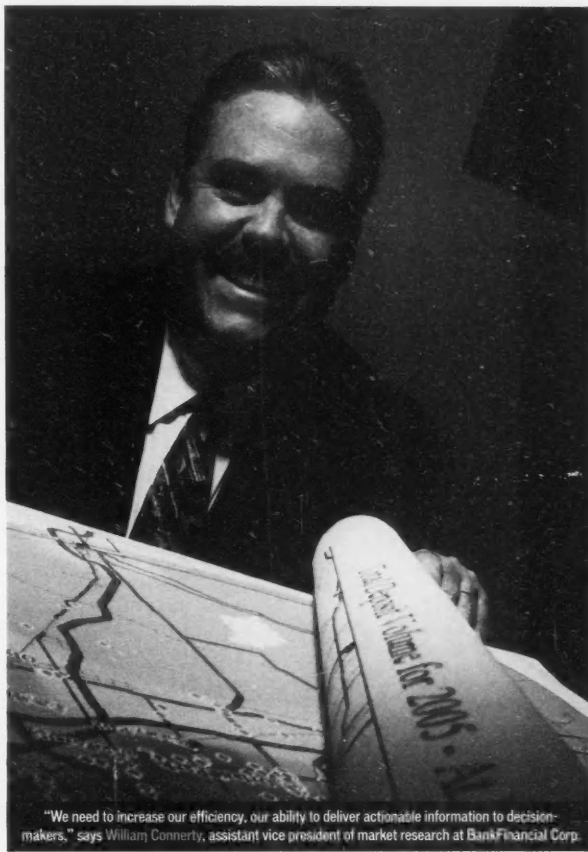
PredictiveMarketing will reduce the time it takes the bank to develop a model by 50% to 75%, says William Connerty, assistant vice president of market research. The first major application is a model to predict customer "churn," the rate at which customers come and go. It will be used to identify the customers most likely to leave the bank during the coming month.

The problem is, the model has access only to account information prepared from weekly and monthly summaries, not to the daily customer activity that would make it more timely. "The biggest obstacle is getting transaction data and dealing with disparate data sources," Connerty says.

The data that BankFinancial needs in order to assess customer loyalty comes from several bank systems and unintegrated customer survey databases. A lot of systems integration and interface work needs to be done before the bank will see the full fruits of its modeling tools, Connerty says.

"We need to increase our efficiency, our ability to deliver actionable information to decision-makers," he says. "I'm under a lot of pressure to deliver."

KXEN Inc. (Knowledge Extraction Engines), an analytic software company in San Francisco, is another vendor that has heard users' cries for easier modeling. It claims that its Analytic Framework product can greatly reduce the time it takes to define, develop and run a model. For example, KXEN's Consistent Coder module automatically transforms raw, inconsistent data into clean, uniformly formatted data that's ready for modeling.



"We need to increase our efficiency, our ability to deliver actionable information to decision-makers," says William Connerty, assistant vice president of market research at BankFinancial Corp.

The Forecast Is Clear

Predictive analytics — a combination of mining, models and math — can tell you what customers will do next. By Gary H. Anthes

"The big sweet spot for KXEN is it cuts data preparation time in half," says KXEN user Seymour Douglas, director of CRM and database marketing at Cox Communications Inc. in Atlanta. It also masks complexity, he says, "so you don't need a big-dollar statistician; you can put someone at a more junior level, because a lot of heavy lifting is done by the tool."

Cox, a cable services provider, uses KXEN's Analytic Framework to identify its most loyal and profitable customers, predict churn and forecast who might be most receptive to cross-selling pitches.

One model revealed that customers in apartments tend to be relatively short-term Cox customers. "So we now offer them product packages where we try to recover our investment quicker," Douglas says. "Without KXEN, that would not have been obvious at all."

But the labor-saving benefits of KXEN come at a stiff price, he says. "For a five-seat license, you'll pay about \$360,000, plus an annual fee of about \$60,000."

Get Organized

Robert Berry, president and CEO of Central Michigan University Research Corp. in Mount Pleasant, says many companies have made huge investments in data warehouses but tend to use them more for analysis of past performance than for "predictive intelligence." One reason is they aren't organized for it, he says.

Berry says predictive modeling should involve collaboration among people who have IT, analytical and business expertise.

"You have to build a business-intelligence team," he says. "But companies are struggling with common issues like who owns it, who manages it and so

on. How do you pull the business skills, the IT skills and the analytical skills across corporate silos and create this team? It's not easy."

Berry advises having the business-intelligence team report directly to a business unit. "It needs to have a definite link to corporate profits," he says.

Giving Ratings to Leads

Hewlett-Packard Co.'s Enterprise Systems Group pulls together people with diverse backgrounds and strong analytical skills — including some people who also have IT skills — for its group that does predictive modeling of customer behavior. The group is part of "CRM operations" under a vice president for sales, says Randy Collica, a senior business/data mining analyst. On a project-by-project basis, people from sales, marketing and other departments may participate, he says.

Collica says it's not necessary to have a professional mathematician on staff in order to do statistical modeling. "But you need some basic statistics," he says. "If someone says, 'This is a normal distribution,' you at least need to know what that means."

HP uses software from SAS Institute Inc. in Cary, N.C., to mine its database of customers and prospects, using regression and other techniques to predict churn, loyalty and where to target promotions. HP also mines its huge stores of unformatted text information, conducting a kind of predictive analytics that's much less common.

HP has some 750GB of customer information, including data from premerger Compaq Computer Corp. that dates to 1984. It has customer data from its call centers, including e-mails from customers and prospects and text typed in during voice calls. Included in these call records are "lead ratings," call center personnel's assessments of a caller's readiness to buy — coded as "hot," "warm" or "suspect."

But some records lack lead ratings, so HP has used SAS's Text Miner to predict the rating these customers should get. Text Miner does that by comparing text from unrated customers to "clusters" of text from rated customers that contain similar terms and concepts.

Text Miner works by preprocessing raw text after transforming it into a grid, or matrix, that relates terms to documents. The matrix indicates the frequency of every term in the document collection. Specific bits of important information, such as customer names, are extracted and summarized.

Next, a mathematical technique

Tool Box for Forecasting And Analysis

Regression: Fits a line to a set of historical data points to minimize the sum of the squares of the distances of the data points to the line. For example, if the line expresses the relationship between independent variables such as age, sex and income to a dependent variable such as sales, then it defines an equation that can be used to forecast sales.

Time Series Analyses

■ **Moving average:** Each new point in the time series is the average of some number of earlier consecutive data points, sometimes chosen to eliminate seasonal factors or other irregularities.

■ **Exponential smoothing:** Similar to the moving average, except more recent data points are given more weight.

Memory-based reasoning:

Sometimes called the "nearest neighbor method," it's an artificial intelligence technique that can forecast something by identifying the most similar past cases and

applying that information to a new case.

Artificial neural networks: Patterned after the human brain, they're composed of a large number of processing elements (neurons) tied together with weighted connections (synapses). [See story, QuickLink a3010.] They're trained by looking at real-world examples — for example, historical sales data and the past values of variables that may influence sales. The training adjusts the weights, which store the data needed to solve specific problems, such as sales forecasting.

Decision trees: Sequential decisions are drawn as branches of a tree, stemming from an initial decision point and branching out to multiple possible outcomes. The trees can be used to predict the most likely outcome and to forecast financial outcomes by multiplying costs or returns at each branch by the probability that of branch being taken.

— Gary H. Anthes

called singular-value decomposition replaces the original matrix with a much smaller matrix by purging unimportant words and highlighting more relevant ones.

The new matrix can be used to place associated terms and documents into categories. HP helps standardize the matrix with synonym lists that say, for example, that customers calling about "disk drives" or "hard disks" are really all interested in storage.

Finally, clustering, classification and predictive methods are applied to the reduced data using traditional data mining techniques. HP uses "memory-based reasoning," a technique that makes a prediction about a record by comparing it with past records with similar characteristics.

These techniques can predict the customer-lead rating with 85% accuracy, Collica says. "Without this technique, I'd have had to go back to the original records and actually read them," he explains. "And when you have that much volume, you can't read them all."

HP also intends to use the text mining and clustering techniques to find out what loyal customers tend to talk about when they contact an HP call center, as well as what's on the minds of those customers deemed least loyal. The goal, of course, is to win over the less loyal ones.

Collica says HP has yet to exploit a number of promising text data sources. For example, it will analyze the text in warranty claims to glean insights about problems customers are having with products and the text in warranty cards to better understand its customers.

HP will also try to mine information from customers' and prospects' own Web sites. "Web sites are a great source of wonderful information about your customers," Collica says. ■

PREDICTIVE MODELING

A Costa Rican bank uses cost modeling to better understand its operations and to make decisions such as whether to add more bank tellers:

QuickLink 37114
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The biggest obstacle is getting transaction data and dealing with disparate data sources.

WILLIAM CONNERTY, ASSISTANT VICE PRESIDENT OF MARKET RESEARCH, BANKFINANCIAL CORP.



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Unexpected Insights

The results of data mining queries can range from utterly baffling to very useful, with lots of surprises in between. *By Mitch Betts*

SOMETIMES the results from data analysis are just plain absurd. Web logs show that one of the most common search phrases entered at *Computerworld's* Web site one week was "Ryder trucks." Nobody knows why.

More often, data mining yields unexpected nuggets of information that open the company's eyes to new markets, new ways of reaching customers and new ways of doing business.

Samsung Electronics America in Irvine, Calif., for example, analyzes reports from 10,000 resellers to identify "lost deals," that is, orders that went to competitors. In one business segment — computer monitors sold to the health care industry — Samsung found that 40% of the lost deals went to one competitor and represented 80% of the total lost revenue.

Knowing those chilling facts, Samsung is working more closely with hardware integrators in the health care field to win more of those orders, says Helman Lukito, a Samsung marketing manager. But until the company collected and analyzed the data from its reseller extranet, which is powered by software from San Francisco-based Allegis Corp., Samsung was "going into the market blind," Lukito says.

Sometimes a company likes what it sees when it analyzes the data. Catalog company Lillian Vernon Corp. in Rye, N.Y., has always been strong with female shoppers but had trouble attracting male customers. Using Web analytics from Fireclick Inc. in Los Altos, Calif., Lillian Vernon discovered that men — who might not flip through a Lillian Vernon paper catalog — were

happy to shop at Lillian Vernon's Web site. Since that discovery, the company has placed products that appeal to men more prominently on its Web site, a company spokesman says.

An important lesson from data mining is that stereotypes are often wrong. For example, an image of motorcycle owners as Hells Angels fades away when you learn that they usually rank within the highest income bracket in their neighborhoods, says Jordan Modell, senior vice president of database marketing at Wunderman in New York, a division of Young & Rubicam Inc.

"What you thought previously might not be true," Modell says. "That's what makes data mining fun, but there's a purpose to it, too," because it means the company can send marketing messages to people who will be receptive, he adds.

Modell's data analytics team takes large extracts of clients' data warehouses, matches them with external databases and then uses mining tools from SAS Institute Inc., SPSS Inc. and Brio Software Inc., as well as direct SQL queries.

Some results are almost common sense. For example, the best markets for toy sales are places where there are lots of children and lots of toy purchases, such as Little Rock, Ark., and Macon, Ga., says Warren Foster, director of marketing intelligence at The Martin Agency, a Richmond, Va.-based advertising agency. He uses mapping software and data sets from MapInfo Corp. in Troy, N.Y., to pinpoint areas where clients should advertise.

But some results are counterintuitive. For example, Foster says Phoenix isn't a good place for selling golf clubs,

despite the many golf courses nearby. Why? Tourists and conventioners play in Phoenix, but they don't buy their clubs there. It turns out the best places for golf club sales are Rochester, N.Y., and Detroit, where there are many avid golfers who buy their clubs locally.

Perhaps the most important value of data analytics is that they help business managers make decisions based on facts rather than on old assumptions or gut feelings, many users say.

New York-based cosmetics and fragrance firm Coty Inc. uses financial analytics from Hyperion Solutions Corp. in Sunnyvale, Calif., to settle internal debates about resource allocation for various product lines, says Jim Shiah, senior vice president and corporate controller. The facts about sales and profitability of each product line have put an end to the "democratic anarchy over resource allocation and elevated the level of discourse," Shiah says.

Ace Hardware Corp. in Oak Brook, Ill., finds that the facts gleaned from its data warehouse can persuade reluctant store owners to raise or lower their prices. "We had one store that only sold one wheelbarrow a year, but when he lowered the price, he sold four in one month and made more money than he did the previous year," says data warehouse architect Mark Cothron. Ace uses analytical software from Informatica Corp. in Redwood City, Calif.

And conventional wisdom held that batteries and light bulbs have to be

Did You Know?

More quirky insights from data mining:

■ Bank customer-service centers experience a huge spike in calls between midnight and 3 a.m. (Source: Wunderman, New York)

■ The most frequent callers to bank customer-service centers phone in more than 200 times per year, and yet they generally rank lowest in deposits. (Source: Wunderman)

■ According to the Florida Marine Research Institute, one quarter of the manatees in the Atlantic Ocean die from boat collisions. (Source: SAS Institute Inc., Cary, N.C.)

■ Call centers have found that callers from the South talk about 20% longer, even for the same type of call. (Source: Steve Meyer, Quatro Corp., Charlotte, N.C.)

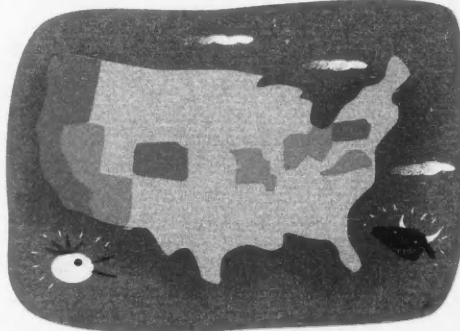
priced very competitively because they can be bought at many different places. But data mining found that shoppers don't really do a lot of comparison shopping for those items, says Diane Flynn, technology business manager at Ace. "People have their long-held theories, but with the facts, you can prove them right or wrong." ■

PLAYTIME

Want to play with some data analytics yourself? Visit the Web site powered by *Analytics Software* from *Dunhamco Inc.* to do your own analysis of data in the news. www.storydata.com

Chicken Burgers vs. Beef Burgers

Using business-intelligence software from Cognos Inc., restaurant chain Red Robin Gourmet Burgers Inc. in Greenwood Village, Colo., can analyze what's selling where and then adjust advertising and promotions to local markets, says Rob Jakob, director of restaurant systems. For example, according to 2002 data, patrons on the West Coast eat about 40% more chicken burgers than patrons in Missouri do, Jakob says.



■ Above-average sales of chicken burgers: Oregon, California, Washington, Pennsylvania, Colorado

■ Above-average sales of beef burgers: Missouri, Arizona, Virginia, Ohio, Indiana, Nevada

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SNAPSHOTS

Buying Intentions

The top five types of software that IT executives intend to buy this year:

- 1 Content/document management
- 2 Query/reporting/analysis
- 3 Project management
- 4 Web management applications
- 5 Web analytics

Base: 150 senior IT executives

SOURCE: ABERDEEN GROUP INC., BOSTON, MARCH 2003

Barriers To Business Intelligence

What are the biggest challenges of implementing business-intelligence and data warehousing projects in your organization?

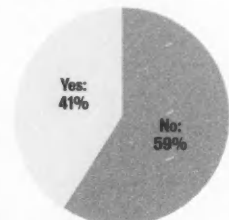
- 1 Budget constraints
- 2 Data quality
- 3 Managing expectations
- 4 Implementation time
- 5 Culture change
- (Tie) Data integration

Base: 1,648 companies in an online survey

SOURCE: IDC, FRAMINGHAM, MASS., JANUARY 2003

Failure Rate

Has your organization experienced any data warehouse project failures?



Base: 142 companies worldwide

SOURCE: CUTLER CONSORTIUM, ARLINGTON, MASS., JANUARY 2003

MARK HALL

Trust, but Verify

ONCE, BACK IN THE 1990s, I hosted an invitation-only party for my magazine at a trendy bar in Boston. My assistant arranged it all, including hiring a bouncer, whose frightening size was surpassed only by his scary disposition. When I arrived, somewhat late and without a pass, the bouncer blocked my path. I pointed to my picture on the invitation in his hand, but he just shrugged and said, "You don't look like you."

Although the girth and personality need not be similar, I believe that the growing population of "delegated administrators," or data gatekeepers, should have the same innately skeptical nature as that Boston bouncer. Because when you hand over the keys to your data to someone outside IT, you want that person to be extremely selective about who gets to see what data, when and why.

Assigning gatekeeper duties to non-IT workers isn't new. With the advent of networked PCs and the Web, virtually all data entry work moved from IT to end users, and new data permissions had to be part of that change.

These gatekeepers distribute data rights for certain applications inside and, increasingly, outside companies. Say a new employee or manager is hired.

The data gatekeeper has to decide what level of data access they get. Or a disgruntled employee is fired. The data gatekeeper turns off his access immediately. The job is usually undertaken by a specific individual inside an organization who adds those duties to his regular tasks. But from IT's perspective, that person's job is a process that can make or break the usefulness of an application. The responsibilities of the data gatekeeper have to be under IT's control and should be restricted to specific applications for a defined group — not the entire user population.

Take access rights. You could design and write a program that connects a biometric database to the corporate HR application to identify users and verify their roles in the company. Next, you could develop a Q&A program to determine which applications those people need. Those results could then be pushed into a database that ties applications to job functions. The three could then be linked to serve up the right software to the right individual.

Most companies don't go to that kind of trouble and expense because it's far more efficient to simply have a trusted person — your systems administrator — give workers access rights. But even your sysadmin can't make the best decisions when it comes to access rights for your customers or other people within your supply chain.

That's why Avnet Inc., a global distributor of high-end computer and network systems in Phoenix adopted this data gatekeeper approach for its Channel Connection application. Hundreds of value-added resellers that acquire products from Avnet use Channel Connection to access real-time data on orders, credit status and other information.

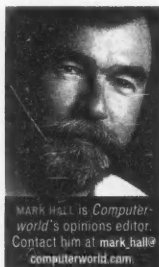
Dave Stuttard, vice president for applications solutions in Avnet's computer marketing group, says IT staffers don't have the level of information about customers to determine who would be best suited to access the Channel Connection application, so Avnet trusts its sales staff to sign up customers and assign them rights to the numerous application modules inside Channel Connection. As data gatekeepers, the salespeople are trusted to make the decisions about who else can be trusted.

But Avnet also heeds that old Russian proverb: Trust, but verify. Every salesperson's recommendations must be approved by an Avnet sales operations manager.

Once given access, the customers designate a data gatekeeper (approved by Avnet), who has broader data-access privileges. For example, as employees' roles change, a customer's data gatekeeper can update the system to swap one user's rights for another.

The extension of trust through the data gatekeeper process is essential to making this kind of application work outside a company. But equally vital is having a solid security system in place. Avnet uses Directory Smart, a secure LDAP database from OpenNetwork Technologies in Clearwater, Fla. Stuttard says the product's single sign-in feature makes it easy for users to navigate through the multiple application modules, which means customers actually use the program. And its database gives the data gatekeeper control "down to the page level" by assigning a user's role and privileges, he says.

Of course, a customer's data gatekeeper can't change his company's access rights. Only Avnet's staff can do that. Because, as Avnet knows, the benefits of having someone watch the gate can quickly vanish when your trust is placed in the wrong hands. ■



MARK HALL is Computerworld's opinions editor. Contact him at mark.hall@computerworld.com.

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Real-time data analysis sounds good, but not if the data is wrong or can't be absorbed by the organization. By Barbara DePompa Reimers

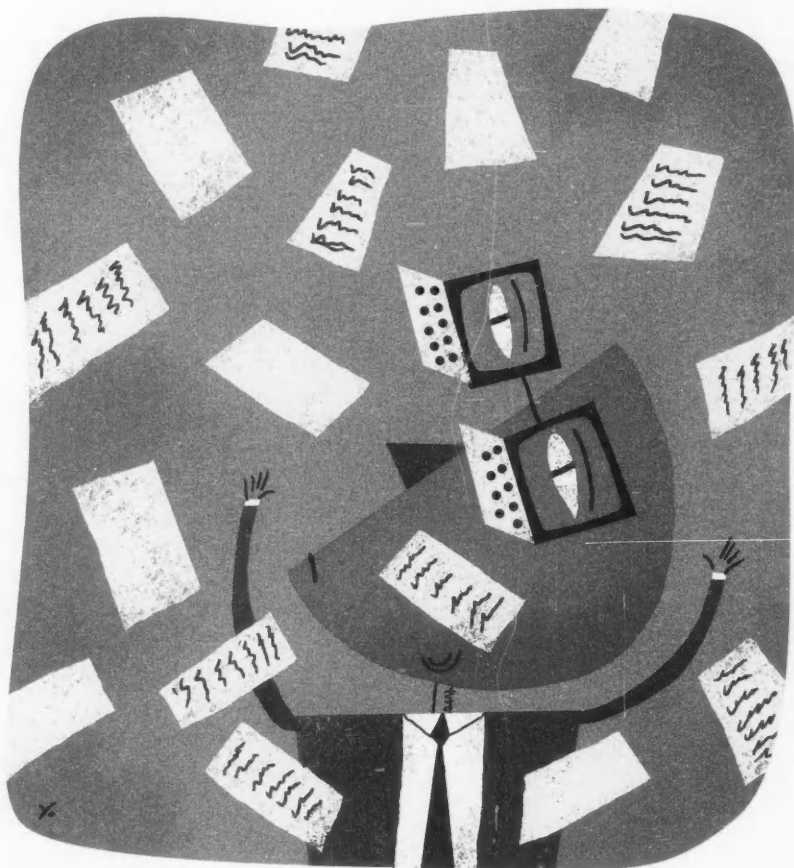
THE NEED to speed up business decision-making to keep from falling behind the competition is driving companies to use real-time analytical tools. With them, they hope to more quickly exploit key corporate transaction data housed in databases, enterprise data warehouses and other data stores.

But the move to instant analytic insights comes with big trade-offs and incremental costs, say analysts and users.

Glib executive orders to provide real-time data feeds everywhere in the company can be counterproductive if the data quality is low or the company doesn't have the processes in place to actually analyze and act on the data. Besides, real-time data analysis may be a high-payoff pursuit in only a few mission-critical areas of the company.

Those negatives don't appear to be quelling interest, however. In a December 2002 survey of 700 IT executives by Evans Data Corp. in Santa Cruz, Calif., 48% of respondents said they were already analyzing data in or near real time, and another 25% reported plans to add real-time analytics this year.

A key issue is how the term *real-time analytics* is defined, because there's confusion about what constitutes real time vs. near-real time vs. not real time. Joe McKendrick, an analyst at Evans Data, says a strict definition of *real-time analytics* is dynamic analysis and reporting based on data entered into an operational system less than one minute earlier. At most businesses, however, analytics is considered real



Too Much Of a Good Th

time if it's conducted on data collected within the past hour, and near-real time is analytics conducted on data collected within the past 24 hours, McKendrick says.

Absorbing the Data

McKendrick says the growing interest in real-time analytics can be attributed to the pressures on businesses to make faster decisions, keep smaller inventories, operate more nimbly and track performance more carefully.

Trouble is, there may be no reason to use real-time analytics if a company can absorb its transaction information only on an hourly, daily or weekly basis. For example, at MBIA Insurance Corp. in Armonk, N.Y., overnight updates work best to feed the OLAP engine used to help the company decipher risk related to mortgages, insurance policies and other services.

"What we've found is that overnight updates are plenty, as long as users can gain immediate access to the information they need to make business decisions quickly during the day," says Lynn Jacobs, associate vice president for IT applications at MBIA. Using the Essbase OLAP tool from Sunnyvale, Calif.-based Hyperion Solutions Corp., business users at the insurer can quickly analyze financial information in order to assess risks and make fast business decisions. The number of financial analysis applications supported by the Essbase tool will be expanded this year from the current 10.

Too Many Iterations

In many traditional business environments, real-time analytics can be overkill. Barton Goldenberg, president of ISM Inc., a CRM consultancy in Bethesda, Md., offers the following example: Three managers meet to discuss business development issues, each armed with sales, market or target information they captured from the system at different times of the day. Each manager has created a snapshot to present an accurate picture, but the numbers won't match. "This situation will hardly help speed decision-making," Goldenberg says.

In other cases, real-time analytics may make it easier to make bad decisions fast, because of faulty data.

Managers at Greeneville, Tenn.-based Forward Air Corp. now can get their hands on real-time information via the company's intranet. Using specialized re-

porting and analytical tools from Appfluent Technology Inc. in Arlington, Va., they can track things like the amount of freight shipped by various customers. The next goal, says Glenn Adelaar, vice president and CIO at the trucking company that serves the air-freight industry, is to enable department managers to analyze more of the transaction data that's accessible via the real-time analytics tool.

But a manager who wants to track his salespeople's daily contribution will find that timing is a big issue. Right now, about 90% of sales transactions are entered within 20 minutes of completion, Adelaar says. "But that 10% will get some poor salesperson clobbered," he says. Adelaar says that although it's critical to get accurate data to business managers quickly,

the business processes that support those data feeds must be made bullet-proof to attain high-quality insights.

Real-Time Tips

- **Stick to analyzing performance metrics backed by bulletproof business processes.** Poor data quality can kill a real-time analytics project.
- **Prioritize applications that require analytics, and be sure to solve specific time-sensitive problems.**
- **Take time to carefully set up the application to be analyzed in real time.** If not properly planned and executed, the analytics tool won't catch big problems, which could impact corporate supply and demand.
- **Seek out cutting-edge analytical tools.** Many real-time analytics products are so new, it pays to carefully investigate vendors' viability plans.

er, operates two customer service centers staffed by 550 representatives. The company uses San Mateo, Calif.-based E.piphany Inc.'s Real-Time tool to ensure that employees make the right offers at the right time without relying on guesswork, says Derek Pollitt, associate director of CRM strategy and deployment at Bell Mobility in Mississauga, Ontario.

Since the Real-Time tool was implemented in September, sales per hour have increased 18%, and total inbound marketing revenue increased by 16% in the first month. Bell Mobility has also been able to speed the time it takes to create new marketing campaigns by 75%.

Tools and Troubles

The real-time analytical tools now available are primarily from new, small suppliers such as Aleri Inc. in New York or a few more-established providers such as Teradata Corp., Sybase Inc., InterSystems Corp. or E.piphany. These vendors offer tools meant to help companies in specific areas such as customer relations, rapid application development or the need for nonstop operations, says Alex Veystel, an analyst at Aberdeen Group Inc. in Boston.

Meanwhile, larger companies are having trouble

Following the Sun

Need to get that business intelligence report done overnight? A few IT users are starting to depend on offshore outsourcing to get the job done faster and cheaper.

Electronic Data Systems Corp. now has several customers that farm out portions of their business intelligence work to EDS sites in countries such as Ireland and New Zealand, according to EDS consultants Dan Schwartz and Bill Dodds. Schwartz says this works best in two areas: the data integration process, also known as the extract, transform and load (ETL) process; and OLAP reports.

First, EDS consultants work with the clients to establish the specifications for the data reporting effort, and then the job is sent to the offshore assembly line. For example, Dodds says, the first eight-hour shift might handle the ETL work and then pass it to the second shift — perhaps in a different country — to handle the OLAP report and delivery. Taking advantage of time-zone differences, the report can be finished twice as fast, Schwartz and Dodds say.

But in this tough economy, the real reason companies go offshore is to cut costs: Offshore labor costs are 50% to 80% cheaper. But the offshore projects require more overhead to manage the project and establish the specifications, so the net cost savings are closer to 15% to 25%, Schwartz says.

— Mitch Betts

finding off-the-shelf tools to extract pertinent information from various systems and transactional databases. So they have to create their own enterprise application integration middleware to extract the data and send it to analyst desktops, Goldenberg says.

For now, the cost to gain instant intelligence via real-time analytics is high. But in the future, analysts say, a faster return on investment for real-time analytics is possible — if companies can change processes and migrate to newer technologies such as XML, J2EE and Microsoft Corp.'s .Net.

As hardware costs plummet, bandwidth expands and storage is increasingly commoditized, it will become far easier and less costly to access and analyze operational data in real time than in any current relational database environment, says Veystel.

Ultimately, analysts say, it's up to each business to seek insights delivered at the right moment to help speed crucial business decisions. Whether that information is updated once an hour, once a day, once a week or once a month will depend on each company's needs. ■

DePompa is a writer and editor in Germantown, Md. Contact her at bdpompa@comcast.net.

LEGACY BOTTLENECK

Top executives are demanding real-time financial and operational data, but IT shops can't deliver it because of legacy system constraints:

QuickLink 36880
www.computerworld.com

ing?

The Almanac

An eclectic collection of research and resources. *By Mitch Betts*

Dashboards: Not Just For Execs Anymore

When people think of management dashboards, they often think of what used to be called executive information systems (EIS). An EIS provides a fancy computer display of key financial metrics for the corner office. But research by John Hagerty, an analyst at AMR Research Inc. in Boston, indicates that dashboards (also called scorecards) are showing up at all levels of the company and provide data other than financial metrics.

Call it the democratization of dashboards. Hagerty says they're being used in a variety of departments, including customer service, manufacturing, sales, human resources and supply chain management. The big difference is that these dashboards provide operational performance metrics instead of financial statistics.

Message to Vendors: Don't Get Too Fancy

Skip the bells and whistles, and just give customers the core business-intel-

ligence capabilities, said Gartner Inc. analyst Bill Hostmann in a recent warning to vendors. "A vendor putting all of its resources into the latest, trendy technology is usually wasting its time and money," he said.

Gartner's study of the business-intelligence software market found that IT managers "are unimpressed by technology hype" and that they want some fairly straightforward things, such as:

1. **Ad hoc queries**
2. **Access to multiple databases**
3. **Scalability**
4. **Ease of integration with back-office systems**

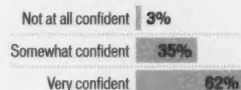
In other words, Hostmann says, vendors should steer clear of fads, make scalability and integration high priorities and make ad hoc queries easier to do.

Data-Quality Perceptions

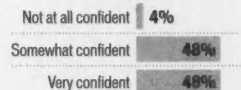
IT managers are a bit more skeptical than business managers are about the quality of the data in their business-intelligence systems.

How confident are you in the accuracy and reliability of your business-intelligence data?

Corporate management:



IT management:



Base: Online survey of 121 corporate managers and 363 IT managers.

SOURCE: IDC, FRAMMINGHAM, MASS., JANUARY 2003

Patent Watch

■ **A bilingual translation database.** The database stores pairs of sentences, one in English and its counterpart in French, for example. When the user enters a text fragment in English, the database retrieves the corresponding text in French. **Inventors:** Emmanuel Roche and Yves Schabes at Global Information Research and Technologies LLC, Boston. — U.S. Patent No. 6,535,842, issued March 18

■ **A wide-area network of vending machines connected to a host computer, which collects sales and maintenance data in a data warehouse.** **Inventors:** Thomas P. Howell and Kevin Ward, at The Coca-Cola Co., Atlanta. — U.S. Patent No. 6,462,644, issued Oct. 8, 2002

■ **A method of synchronizing two incompatible databases, such as a PC database and a handheld one.** **Inventor:** David J. Boothby at Pumatech Inc., San Jose. — U.S. Patent No. 6,532,480, issued March 11

Events

■ **The Data Warehousing Institute's Spring Conference**

May 11-16, San Francisco
www.dw-institute.com

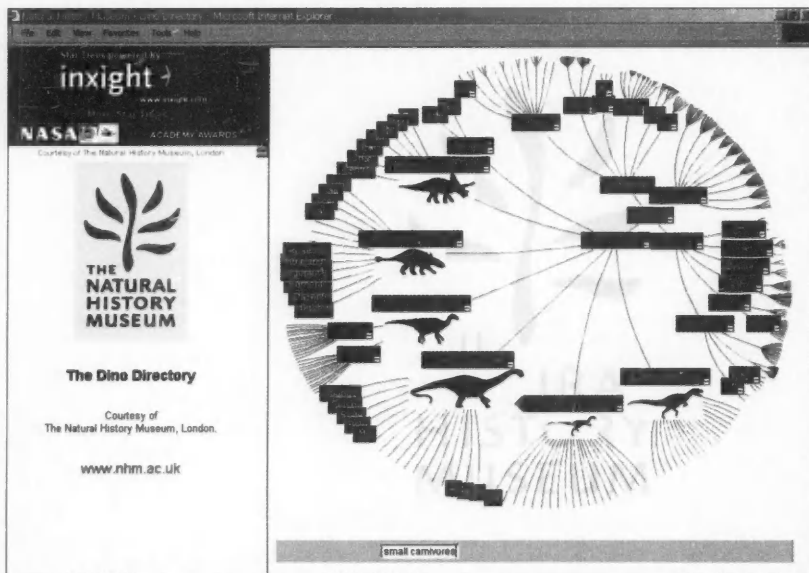
■ **Gartner Business Intelligence 2003**

May 15-16, Chicago
www.gartner.com

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QuickLink k1800
www.computerworld.com



Hub-and-spoke data visualization: The "star tree" graphical user interface - powered by software from Inxight Software Inc. in Sunnyvale, Calif. - helps users navigate large, complex hierarchies of information in a hub-and-spoke fashion. In this case, a user can navigate the taxonomy of dinosaurs by clicking or dragging the information "nodes" to see related species. The same data-visualization technology can be used to navigate Web sites or analyze text databases at intelligence agencies. More examples: www.inxight.com/products/oem/star_tree/demos.php.

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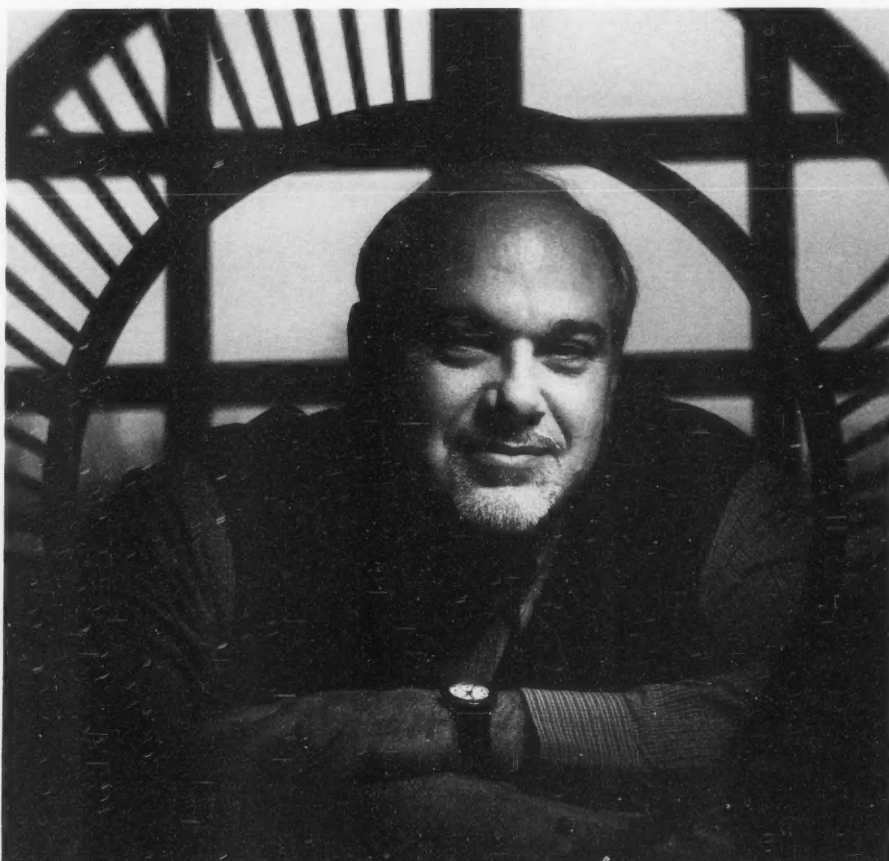
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Don Stoller says when Owens & Minor started internal data mining, "from the beginning, we were aware of security issues around this information."

The data about your best customers may be your company's most vital asset. Here's how to make sure business-intelligence data doesn't fall into the wrong hands. *By Mark Leon*

Keys to the Ki

IT'S NO SECRET THAT in a back room in the typical Fortune 500 company, there's a team of analytical wizards running sophisticated queries that mine for gems such as data about the company's best customers — those top 20% of clients that produce 80% of the company's profits. These jewels can be a business's most valuable intellectual property, which makes them very valuable to competitors.

What's to prevent that data set from walking out the door or falling into the wrong hands?

Sometimes, not much. Many companies lack the internal controls to prevent that information from leaking. The problem is that business-intelligence data is as hard to protect as it is important.

"Securing your business-intelligence information and systems is often an afterthought at best," says Cate Quirk, an analyst at AMR Research Inc. in Boston.

Michael Rasmussen, an analyst at Giga Information Group Inc. in Cambridge, Mass., agrees. "Have most IT shops really thought through the security issues around BI?" asks Rasmussen. "The answer is no."

It Can Be a Business

Owens & Minor Inc. had to think about it. Business intelligence is big business at the Reston, Va.-based medical supplies distributor. A \$4 billion company, Owens & Minor counts some of the nation's largest health care organizations among its customers. In late 1996, it started mining data internally using business-intelligence software from Business Objects SA, whose U.S. headquarters is in San Jose.

"From the beginning, we were aware of security issues around this information," says Don Stoller, senior director of information systems at Owens & Minor. "For example, a sales executive in Dallas should only have access to analyses from his region."

Dean Abbott, principal at Abbott Consulting in San Diego, adds, "Don't give access to anyone who doesn't

have a definite need." It is always possible that someone who has legitimate access will abuse that trust, but analysts say you can minimize that potential by strictly limiting access to only those who need it.

To guard against such a breach, Owens & Minor used role-level security functions in the Business Objects application that clearly define who has access to which data. "This meant we had to build a separate security table in our Oracle database," says Stoller.

A few years later, when the company wanted to open its systems to suppliers and customers, security became even more important. In 1998, Owens & Minor moved quickly to take advantage of Web-intelligence software from Business Objects that's designed to Web-enable business-intelligence systems.

The result was Wisdom, a portal that lets Owens & Minor's suppliers and customers access their own transactional data and generate sophisticated analyses and reports from it.

"In [business-to-business transactions], security is key," says Stoller. "We had to make absolutely sure that Johnson & Johnson, for example, could not see any of 3M's information. This meant we had to set up specific customer and supplier security tables, and we had to maintain new, secured universes in Business Objects."

Wisdom was such a success that Owens & Minor decided to go into the intelligence business with the launch of Wisdom2 in the spring of 2000. "We capture data out of a hospital's materials management system and load it into our data warehouse," Stoller explains. A hospital can then make full use of its business-intelligence software to mine and analyze purchasing data. Owens & Minor receives a licensing and maintenance fee for the service.

Administration Nightmare

Layers of security and encryption imply a considerable amount of systems administration overhead. Both Quirk and Rasmussen say that's the main reason security concerns about business intelligence are often swept under the

Safe and Secure

■ Build in security, such as multi-level access controls, at the outset—not as an afterthought.

■ If you have distributed systems with no obvious central directory, consider either a homegrown or a commercial identity management system.

■ Don't include information in business-intelligence reports that isn't strictly necessary. At FleetBoston, for example, reports typically don't

contain customer identifications.

■ Role-level management is a good idea, but try to devise a security hierarchy first. This can help drastically reduce the number of roles you have to deal with.

■ Don't think that business-intelligence security is about building a bigger moat or perimeter security. It requires internal policies that specify who can see what.

— Mark Leon

carpet. The issues of authentication (identifying the user) and authorization (what things the user is allowed to do) must be addressed, usually across different applications, Rasmussen says, adding, "Systems administration can be a real nightmare."

"We are going through some of this," says David Merager, director of Web services and corporate applications at Vivendi Universal Games Inc. in Los Angeles. "Our business intelligence needs more security attention."

Vivendi generates business-intelligence reports from two systems: an Oracle-based general ledger database on Unix, and a data entry application for budgets on a Microsoft SQL Server database. The heart of the business-intelligence system consists of Microsoft's OLAP application and software from Comshare Inc. in Ann Arbor, Mich., that provides the Web-based front end for the analytics. "Our budget teams use these reports to do real-time analyses," says Merager.

Rodger Sayles, manager of data warehousing at Vivendi, says one way to secure such a system would be to assign roles to all users within the Microsoft application. Roles determine precisely what a user is allowed to see and do and are usually managed within a directory. If your computing architecture is amenable to a single, central-

ized directory that supports roles, this may be an attractive solution.

"The problem is that once you have over 40 distinct roles, you run into performance issues, and we have identified about 70 roles," Sayles explains.

He says there's a way around this difficulty. "I think we are going to use a combination of portals and roles. A user would sign on through a particular portal, which would effectively place the user in a role category. This reduces the burden on the application," says Sayles.

Keep It Simple

Dave Stack, manager of corporate financial planning at RSA Security Inc. in Bedford, Mass., employs a similar strategy using some of the same software from Comshare. RSA's business-intelligence applications produce forecasting, budgeting and product reports.

He says good planning has also helped keep systems administration headaches to a minimum. "Comshare gives you about nine types of users," says Stack, "and that is plenty for us."

What makes this small number of profiles possible, he explains, is a good design that uses a hierarchy of four security levels. "These, together with security features in our Microsoft SQL Server database, make it easy for us to create cross-functional roles," says Stack.

But Stack says things would have been a lot more difficult if he had started deploying business intelligence without having a good security plan in place first.

John Schramm, manager of strategic security architecture and engineering at FleetBoston Financial Corp., says a good place to start planning is with a classification system that defines different levels of security for different

types of information.

"In order to protect data," says Schramm, "you need to know what the rules are. Our classification system enables us to set the rules that we need to design security around information."

Schramm worked with consultants at Greenwich Technology Partners Inc. in White Plains, N.Y., to define four security levels: highly confidential, which defines data with trade secrets or wire-transfer information; confidential, such as transactional data and credit card numbers; confidential informational, defined as nontransactional data such as customer lists; and company-restricted data like job postings and phone directories.

Security systems, Schramm explains, can include field-level encryption, transport-level security such as Secure Sockets Layer and Secure Copy Protocol, and authentication and authorization. "Combinations of these kick in at different levels in our classification hierarchy," says Schramm.

FleetBoston is a large, distributed enterprise, which makes classification even more important. "We try to maintain these standards across our various lines of business," says Schramm. "They are all different, and one of my primary responsibilities is to integrate them in a secure manner. I need to know what data the different lines of business need."

Complex Profiling

Most companies have thought through network and software security issues, which is why they don't come up that often in discussions about business-intelligence security.

When it comes to such data, the security concerns are more about policies. "It is always possible for someone within the company to abuse security privileges," says Rasmussen. "But the best defense against this and most other breaches is to make sure you have good, strong policies in place—things like authentication and authorization."

Schramm agrees. "The big challenge is in determining the data elements that define the user of a particular [business-intelligence] system. These profiles are a real challenge. As just one example, you may have employees who are also customers.

"You need to know who the actors are," says Schramm. ■

Leon is a freelance writer in San Francisco. Contact him at mrlleon@usfca.edu.

ngdom

Data Models

DEFINITION

A **data model** is a plan for building a database. The model represents data conceptually, the way the user sees it, rather than how computers store it. Data models focus on required data elements and associations; most often they are expressed graphically using entity-relationship diagrams. On a more abstract level, the term is also used in describing a database's overall structure — e.g., a relational or hierarchical data model.

BY RUSSELL KAY

IN THE REAL WORLD, we think of data as facts, figures and other bits of knowledge. Put a lot of data items together in a useful form, and you get information — maybe even intelligence.

Often, people can intuitively understand a given piece of data in isolation, but a computer can never do so without help. In computers, we store data in a database — a highly structured, carefully defined and rigidly formatted collection of records — so that we can retrieve it, use it, analyze it and work with it to run our businesses.

In fact, it is only the organization of a database that gives meaning and utility to the data inside it. Without that organization, all we have are undifferentiated ones and zeroes — not numbers, not letters and certainly not knowledge.

Thus a critical step in data processing is the creation of a plan for the database that's simple enough for the end user to understand, yet detailed enough to let the database designer create the actual structure using database software. We call this conceptual plan a data model, though we use this term to describe two

related but different ideas.

One, which we can also call a database model, is somewhat abstract in nature and refers to a database's overall structure, or type. The best-known example is the relational model [QuickLink a3000] used by Oracle, DB2 and SQL Server. Others include flat-file, hierarchical, network, object, semantic and dimensional models.

The second type of data model, or schema, takes the overall structure of one of the standard database models and tailors it to a specific application, company, project or task.

This type of data model gets down to specific data items, including their names, values, granularity and how they relate to one another.

We can compare these data models to the plans for a new building. An architect designs different types of buildings — a sports arena vs. a four-bedroom house, for example — using quite different materials and techniques (steel girders vs. wood framing, cranes vs. ladders). So, too, do we implement the various types of database models (say, relational vs. object-oriented) quite differently on a computer.

When we build a schema,

however, we're working at a detailed, nitty-gritty level; it's more like consulting an interior designer than an architect. The architect plans for a kitchen's space, wiring and plumbing, but the designer helps decide which appliances to buy, how to group lights, where to put the table and chairs, and how many cabinets are needed.

What's in a Model?

To illustrate what goes into a data model, let's assume we're creating a very simple inventory database for a widget-building assembly line. We need to know the following:

■ What data do we include?

Parts numbers for our widget models, the subcomponents they're made from, raw materials and parts suppliers, costs and delivery times, inventory on hand and assembly time.

■ **How do data elements relate to one another?** Some suppliers deliver faster than others but charge more.

■ **What processes, operations and transformations might we need to do?** Calculate total cost per widget.

■ **What kinds of questions will we need to answer?** How much are we paying for parts? How many widgets can we produce next week?

■ **What other business processes or activities might use this data?**

Accounts payable, product planning and sales.

While building this database, our data model proceeds from conceptual model to logical design to physical implementation:

1. Interview business users.
2. Define the data elements

and their relationships.

3. Create a data model.

4. Select the database type and specific database management software (DBMS); often, it will be whatever you're already using.

5. Map data-model elements to tables, and normalize them.

6. Create data type definitions and a database structure.

7. Design the application.

Creating a data model takes a different mind-set than application development does. In Steps 1 through 3, at the conceptual level, we must think about what we're dealing with. In Steps 4 through 6, the focus shifts to how we implement the model. Step 5 marks the transition to logical design and Step 6 to physical design, both of which needed to meet our DBMS's specific requirements. In Step 7, programmers implement the procedures that use and manipulate the data. ■

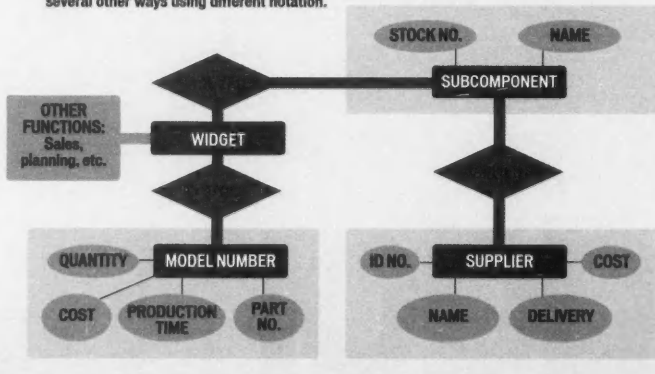
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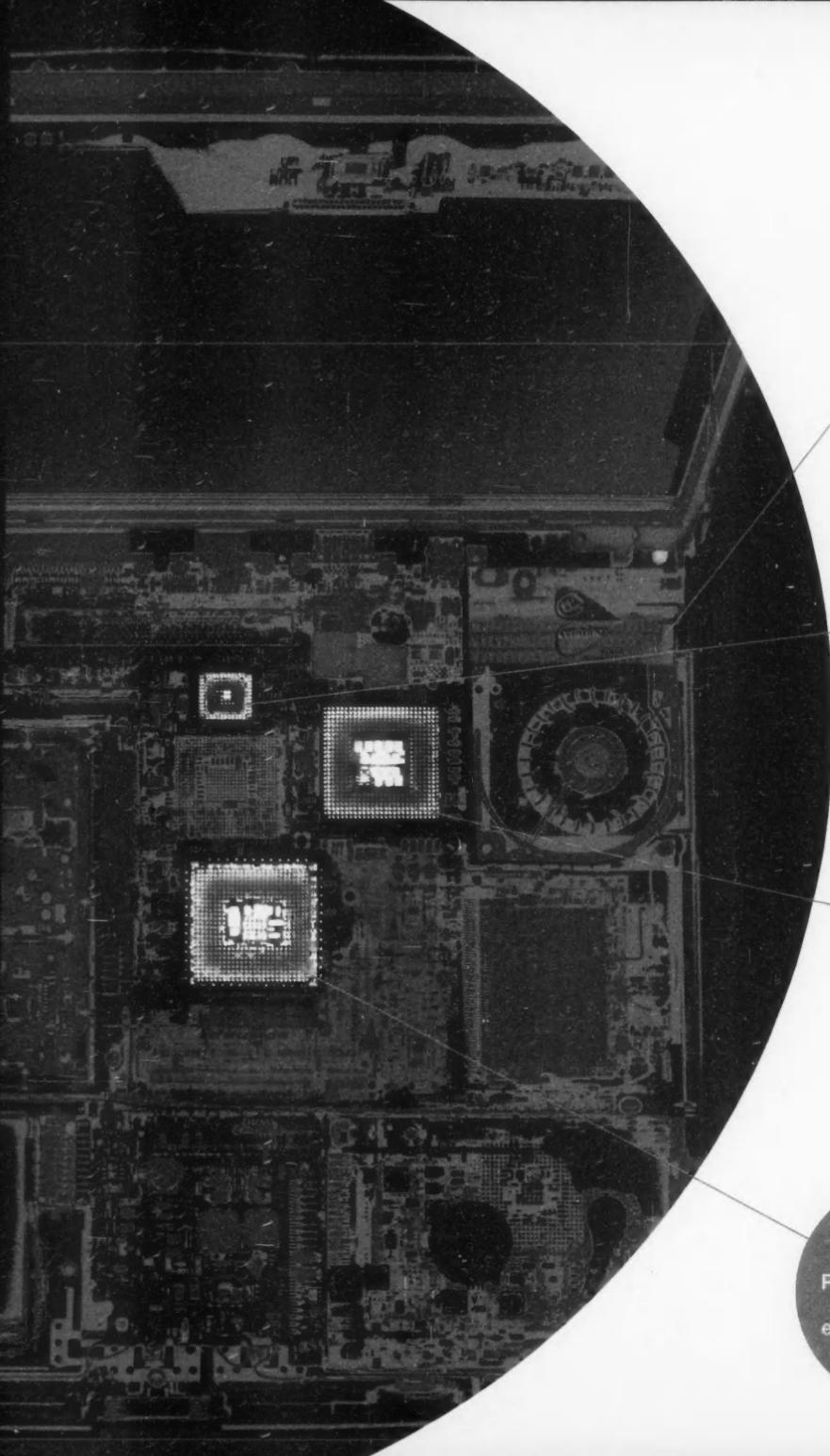
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Data Modeling With Entity-Relationship Diagrams

In the following sample diagram, rectangles represent entities, diamonds are relationships, and ellipses are attributes of entities. Note that there are many different conventions used in entity-relationship diagrams; this same model could be represented in several other ways using different notation.



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Data Architects

How to land a job and keep your skills fresh in the field of data architecture. By Stacy Collett

AT RECRUITING FIRM Emerging Technology Services Inc. in Waconia, Minn., recruiter Jenni Laraway sifts through a swelling pile of résumés, looking for the right blend of data warehousing and business skills. The position to be filled is "data architect," and 25 of her clients need one.

Though she's not short on talented job seekers, 70% of her clients want candidates with enterprise-level business experience, not just data modeling for the human resources department. "That's the skill I'm having the most difficulty finding," Laraway says.

Data architects are a rare breed, according to Dave Wells, director of education at The Data Warehousing Institute, a Seattle-based membership group for business intelligence training and education. They are senior-

level professionals with seven to eight years' experience who can bring together data from all enterprise systems and put it into a package that's valuable to all parts of the enterprise. Demand for qualified candidates has grown 30% to 40% in the past two years as

business intelligence has become more vital to business growth.

CAREERS

Skills
Wells says data architects need to be skilled leaders and mediators between the database staff and business end users. "This job requires the ability to understand business requirements, translate them into technical designs, deal with complexities of integration of disparate systems, investigate the quality of data in those systems and put it all together so it can be accessed, manipulated and turned into informa-

tion," Wells explains. "It takes a more deep-seated understanding of the business" than database administrator jobs or other data warehousing positions, he adds.

Jean Wells, a data architect at the University of Washington in Seattle, says having a wealth of technical experience is OK, as long as the architect is also a good listener.

"That's probably the most critical thing that I do. When you sit with upper-level administrators, sometimes middle management, sometimes clerical people, you need to take their viewpoints, then sift through them" to come up with the best data design, she says.

Training

"Most of my clients don't require certification [in job candidates]," Laraway says. But they're looking for candidates with solid database skills in DB2, Oracle and Teradata, and experience in ex-

tract, transform and load (ETL) tools such as Ascential Software's DataStage and Informatica Corp.'s PowerCenter RT. Skills in modeling, query and reporting tools from Computer Associates International Inc., Cognos Inc. and MicroStrategy Inc. are also in demand.

Eighty-six percent of data architects have a technical background, according to a 2003 Data Warehousing Institute survey of 687 U.S.-based data warehousing professionals. Only 12% come from a business background, and 2% from academia.

Since data architect positions are relatively new, there aren't many certification programs that measure competency, according to Data Warehousing Institute's Wells, though the organization is investigating certification exams in the future.

Salary and Perks

Nationally, data architects earn \$75,000 to \$120,000, according to Laraway, with the highest salaries in the Northeast and on the West Coast, and the lowest in the mid-Atlantic states.

For the right candidate, most companies offer signing bonuses and performance bonuses of at least 10% to 15%, Laraway says. Many companies help with relocation, too. "I'm working on a director of data warehousing search where the performance bonus is 25% to 44%," she says. "That's amazing!"

Employee Spotlight

Hiring manager: Tom Burzinski

Title: Business-intelligence practice manager for the Wisconsin region.

Company: Greenbrier & Russel Inc. in Schaumburg, Ill., a privately held IT consulting firm that specializes in business intelligence, enterprise solutions and advisory services. It also offers corporate training services in new technologies.

Current IT staff: 379 IT professionals; 55 data warehouse professionals in Wisconsin.

Now seeking: Greenbrier & Russel is looking for a senior consultant to build the technical architecture for a large enterprisewide data warehouse, Burzinski says. This person must have knowledge of the ETL process, various data models and the tools to build these models.

Beyond understanding data warehousing concepts, the position requires business knowledge. "They need an understanding of the various ways data warehousing is used for financial vs. marketing applications," Burzinski says.

This person will also be responsible for managing a team of developers through the construction, testing and implementation phases of the projects, the logical and physical database design, and the implementation, as well as for defining and implementing approaches to load

and extract data from the database.

Burzinski is looking for candidates with at least five years' experience in data warehouse implementations, though most of Greenbrier & Russel's data warehouse employees have 10 years' experience.

Other desired skills include designing and optimizing large multiterabyte data warehouses, Oracle, SQL Server or DB2, ETL tools such as Informatica, Microsoft Data Transformation Services, DataStage or Oracle Warehouse Builder. The salary will range from \$65,000 to \$100,000, depending on experience.

Reason for the opening: Greenbrier & Russel's data warehousing business grew 67% to \$5.5 million in Wisconsin in 2002. This year, the firm expects business to grow 30%. "We have several pending client projects starting, but we also do hire for the bench," Burzinski explains. "Right now, as soon as we hire to the bench, within a week they're placed somewhere."

Burzinski says the ideal candidate is a senior consultant with business knowledge as well as IT experience building an enterprisewide data warehouse. "This person is a co-project manager who will work closely with the project manager to run a big part of the project. About 60% of this [pending] project is the ETL part of it."

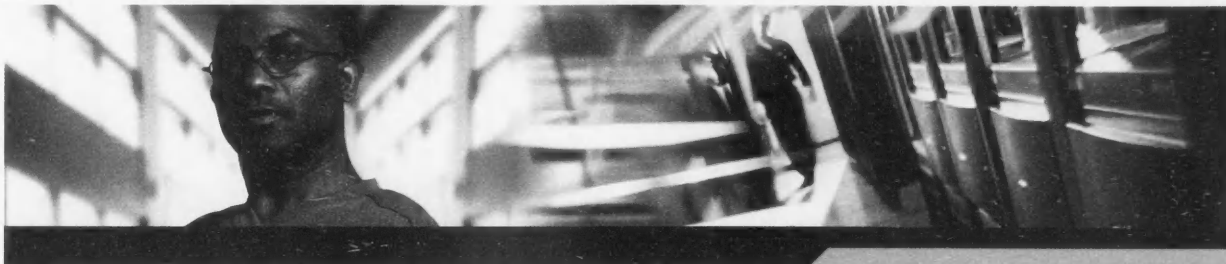
Personality and leadership also top Burzinski's list of

requirements. "People who are not afraid to take the initiative" to help business users improve processes do well in this position, he says. They also must have good listening and guidance skills. "People who can mentor junior people and find a balance between very detailed code and also seeing the big picture - that's the hardest thing to find."

- Collett is a freelance writer in Sterling, Va. Contact her at stcollett@aol.com.



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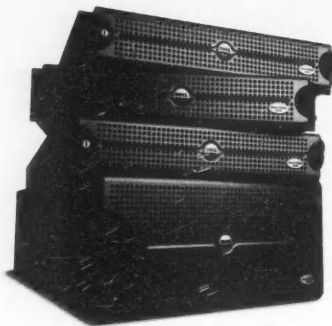
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- 3-Yr Next Business Day On-Site Service*
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The Next Chapter

Predictions: Business-intelligence tools will put middle managers out of work. And e-mail will be mined for valuable information.

■ TOTAL AUTOMATION

In 10 years, virtually all operational decision-making within the enterprise will be automated, thus eliminating the need for more than 65% of the middle management workforce. Today, the most innovative business-intelligence technology is able to recommend the optimal course of action based on business rules, representing the first step in automated decision-making. Tomorrow, automated business models and decision-making processes will optimize goal-setting and performance.

■ **Scott Wiener**, chief technology officer, *Certive Corp.*, Redwood City, Calif.

■ PREDICTING EPIDEMICS

Business-intelligence technology will have a big impact in the medical profession. In the next five to 10 years, it will be possible to determine disease susceptibility in humans and create customized medications for individual patients based on their genetic makeup. And by combining data analytics with geographic information systems, it will be possible to predict and visualize disease outbreaks across the globe.

■ **Don Hatcher**, vice president of technology strategy, and **Anne Milley**, director of analytical strategy, *SAS Institute Inc.*, Cary, N.C.

■ MERGING WITH PORTALS

Organizations usually view portals and business intelligence separately, but in the next few years, the two will become integrated. These technologies

can shrink the amount of data that has to be analyzed to make a decision, in an era when people have less time and must focus on the decision criteria that truly make a difference.

■ **Shari A. Rogalski**, associate partner, *Accenture Ltd.*, Minneapolis

■ MINING THE E-MAIL PILE

Companies are just starting to realize the valuable knowledge and intellectual property that can be found in their e-mail archives. Over the next five to 10 years, those archives will become fully indexed, searchable, rich databases that provide insights about business issues, employees and where competitive advantage resides. For example, a CEO could quickly find out what's going on in a plant in Mexico, without ever leaving his office at headquarters.

■ **Greg Arnette**, founder and chief technology officer, *IntelliReach Corp.*, Dedham, Mass.

■ LOCATION MATTERS

Over the next two years, companies will realize that getting a return on their customer relationship management investments will require combining information about the location of competitors, the location of customers, the demographics and purchase behavior characteristics in different neighborhoods, and the location of business assets — whether they're stores, cell towers or kiosks.

■ **Kevin Antram**, vice president and general manager of the CRM business unit, *MapInfo Corp.*, Troy, N.Y.

■ VENDORS CONSOLIDATE

By the end of 2004, the business-intelligence market will morph from its current makeup of way-too-many tools vendors into a smaller universe of best-of-breed, industry-focused vendors. IBM will compete more vigorously with Microsoft's analytics offerings, probably by acquiring an established vendor like Crystal Decisions Inc. or Cognos Inc. More than two-thirds of the business-intelligence tool vendors in business today will evaporate through acquisitions and closures.

■ **Mike Hennel**, president and CEO, *Silvon Software Inc.*, Westmont, Ill.

■ SELF-HEALING WAREHOUSE

The greatest struggle with business intelligence is the continuous need to ensure that the lowest levels of data used in the summarized analytics and dashboards remain clean, consistent and relevant. We need the data warehouse to have a self-healing capability to automatically sense, detect, notify and repair (when possible) any incorrect, missing or unreconciled data elements. But it will take at least two or three years for that to happen.

■ **Scott Hicar**, CIO, *Maxtor Corp.*, Longmont, Colo.

■ DASHBOARDS RULE

By 2006, most managers will make daily decisions from an on-screen intelligence dashboard. This will be driven by the need for greater productivity, the frenetic pace at which business decisions must be made and an extremely overworked and stream-

lined corporate workforce. This sort of business intelligence will not only change how managers make decisions, but also how corporations and executives are measured.

■ **Brian Gentile**, executive vice president, *Brio Software Inc.*, Santa Clara, Calif.

■ FRAUDBUSTERS

In about two years, we'll be able to catch fraudulent activity nationally and internationally in real time. By analyzing historical fraud activity and tracking present infractions, we can uncover the illegal transport of people, goods and money, as countries share more and more data.

■ **Ron Swift**, vice president of *Teradata*, a division of *NCR Corp.*, Dayton, Ohio

■ THE AUTOBOTS ARE COMING

I expect data mining "autobots" to be included in analytic software within five years, a critical step for improving the utility of data mining technology. These automated tools for finding important and nonobvious data relationships will reduce or eliminate the need for specialized skills to perform data mining.

■ **Richard Skrlletz**, national managing principal for business intelligence, *RCG Information Technology Inc.*, Edison, N.J.

MORE PREDICTIONS

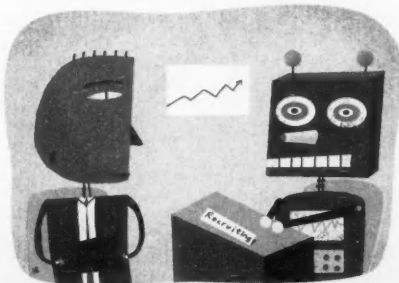
Industry visionaries say the future of business intelligence includes "dashboards for worker bees," as well as expectations of instant information, security and certifiable data quality.

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Automated Job Profiling

By early 2004, predictive analytics will be used in the human resources department to determine which job applicants are most likely to remain with an organization for five to 10 years rather than leave after six months. Predictive analytics will also be used to predict which employees will fit in with a team or are better suited to be a manager or in an individual contributor role. They'll also be used to predict which employees will provide the best customer service or be most likely to steal from the company.

— **Michael D. Blair**, chairman and CEO, *Cyborg Systems Inc.*, Chicago



Software Engineer (NY, NY)
Perform system analysis & design applic. Formulate syst scope & objectives & prepare specs. Make tech presentations to clients in energy sector, incl prototyping & documenting proposals. Design & develop custom Risk Analytic Applications utilizing Visual C++, ASP.NET, C#, SQL Server & Windows NT. Identify problems in existing systems & devise software solutions using ASP.NET and C#. Bach. in Comp. Inf. Syst. Comp. Sci., Comp. Appl. or foreign equiv. 3 yrs exp in job or 1 yrs in related job of Software Dev't or Progrm. Related job must incl exp w/ design & develop of Risk Analytic Applications. Visual C++, ASP.NET and C#. Fax resume to 212-888-0055.

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Programmer/Analyst
Plan, develop, test and document computer programs/software packages using software, logic, programming, statistical programs and Shell/Java Script, ASP, Solaris, Oracle 8i/Forms & Visual SourceSafe, Req. M.S. Comp. Sci. Mail resumes to HR, Technicon Computers 1260 University Dr., Ste. 200, Plantation, FL 33322

Junior Programmer. Asst in writing program specifications & code commensurate to IDS coding style & standards w/ use of C, C++ and Visual Basic programming on UNIX & Windows operating systems under IDS standards. Req: BS in Comp. Eng., Elect. Eng., or Comp. Sci. 40hrs/wk. Job/Interview Site: LA, CA. Send resume to Integrated Decision Systems, Attn: Dept 30, 11150 W Olympic Blvd., LA, CA 90064

Technosoft Corporation has multiple openings for Programmer/Analyst, Software Engineer, Project Lead/Manager. Applicants should have strong skills in Java, Perl, Siebel, Oracle/Informatica, DBA, GUI, Java C++/CRM Applications, ERP & Dataware-housing. Send resume to: 3071 Lawrence Expressway, Santa Clara, CA 95051 or email to jobs@technosoft-corp.com

Manager, Software Engineering

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The successful candidate will be hands-on in the designing, coding, testing and delivery of the software products. A Bachelor's degree in Computer Science or Computer Engineering or working equivalent, and a minimum of five years' experience creating utility leading audio/video communications software is required. Excellent knowledge/experience with C/C++ programming, object-oriented design, software design and development tools, software optimization and real-time software development is required. A solid foundation and working knowledge of audio and video encoding and decoding algorithms and techniques as well as experience in multiple client/server networking concepts (PC, Mac, Unix, TCP/IP) is required. Prior experience with developing networking solutions for IP and isoc communication signaling and data services including a working knowledge of H.323, ISDN, ATM, SIP, SDP, RTP. Superior written and verbal communication skills are also necessary. A proven track record of leading a project from start to end is a must. Prior experience working in a shrink-wrapped software environment is a plus.

Only qualified candidates are encouraged to e-mail their resumes in Word format, to resumes@wave3.com. EOE

Systems Analysts to analyze, design, develop, test, and document Wireless, Data Communication using J2EE, XML, C++, SQL, SMP, WAP, XHTML, JSP, Oracle, etc. under Oracle Mobile Server 9IAS WE, UNIX, Sun Solaris etc. perform reqs gathering, design process, design reviews, code peer reviews, customize and enhance. Program/Analyst to analyze, design applications using C, C++, Java, HTML, VB, JavaScript, SQL, Oracle, MS Access under Windows, UNIX OS, study, evaluate new technologies/methodologies, gather, document reqs under IBM mainframe, test, troubleshoot project appl reqs. Require BS or foreign equiv. in CS/Engg (any branch) with 3 yrs exp. High Salary. Travel involved. FIT Apply to: HR, Unity Inc., 4625 Alexander Rd., Ste 110, Alpharetta, GA 30022.

FT Computer Support Specialist. Responsible for coding, planning and implementing legacy application extension projects and training customer personnel in tool use. 100% travel. Requires in-depth knowledge of J. Walk, GUI/400, Win 9x and TTT. Must have 3 yrs. of exp. Work background must have included providing technical support services to software and/or network end users and supporting J. Walk, GUI/400 & TTT customers across a variety of industries. Salary: Competitive. Send Resume to: HR-Ref. TS, SEAGULL, 3340 Peachtree Rd., Atlanta, GA 30328. Reference this ad. No phone calls please.

Analyst/Architect sought by NJ based Securities Dealer for Jersey City, NJ office. Must possess Bachelor's degree or equivalent in Computer Science or directly related field and 5 years exp. in software development/design/analysis. Exp. must include C/C++, JAVA, Respond to: Human Resources Department #KFP02-98, Knight Financial Products, 130 Chestnut Lane, Suite 102, Minnetonka, MN 55305.

Consultant Software Engineer (Database Administrator)
to develop Oracle & Solaris database applications for entire product life cycle of Co's global online equity trading systems, from product inception to release. Will design, develop, package, monitor production and provide support for these database systems; participate in code & design reviews for each product; perform unit testing and systems testing; write applications in Java; use data modeling development tools including Power Designer; design database models & develop code for stored procedures in SQL database languages; and perform database system application design, modeling and coding in Java and XML. Requires Bachelor's in C.Sc., Engineering, Math, or Physics plus 5 years experience in job offered, OR 3 yrs in database application development. Alternatively, will accept Master's in C.Sc., Eng. Math, or Physics plus 3 years in job offered. 3 yrs in database application development. Candidate must also possess demonstrated expertise administering OLTP & data warehousing databases and demonstrated experience in back-end Oracle database development using PL/SQL, Unix, Shell scripting, Java & XML. Salary: \$91,000/yr. M-F 8AM-5:30PM. Send 3 resumes to Case #200116234, Labor Exchange Office, 19 Stanford Street, 1st fl., Boston, MA 02114. EOE. Applicants must be workers eligible to accept full-time employment in U.S.

SOLUTION ARCHITECT. Gather & analyze data & info systematically; make timely & sound decisions; compare moderately complex projects that require understanding of inter-IT/IT areas of tech/knowledge; demand knowledge of multi-vendor network, application & platform solutions; monitor house & third party vendors to develop training solutions; install & configure networks; applications & platforms using variety of industry protocols & technologies (TCP/IP; computer HW (driver) development process & OS products); evaluate client & vendor proposals/docs for internal & external issues; using knowledge & tech resources of computing in general & IT industry to provide solutions & enhancing technology for Help Desk operations; Sys Mgmt or Ntwk Mgmt; & plan & execute variety of tasks & merge details for complex projects. Req: Bach deg or foreign equiv* in CS, CE, EE or mfg & 4 yrs exp in job offered or in IT occupations as Tech Consultant, Product Specialist, Engng or mfg. Knowledge & exp w/ following: TCP/IP, OC process, computer HW (driver) development & support for L series computers, "if no deg or unrel deg then will accept 3 yrs exp in job offered or in IT occupations as jr exp or comp toward req. Send: \$75,389/yr. Joselyn, Attn: ME 8am-5pm, 40 hrs/wk. Send resume to: Attn: Abirah Bhadrabadi, Job Ref: SBAAH-KTTX-52414, New Workforce Development, P.O. Box 94600, Lincoln, NE 68509. Must have proof of legal authority to work in U.S.

Digital Nervous System, Inc. seeks Active Developers, Programmers for functioning as part of a 3 member team, which carries the responsibilities of designing, developing, and implementing all system functionality within a full-scale commissioning program. Responsible for mentoring and instructing the full time team. Requires experience with ActiveX, Sql server, SQL, SQL LOADER, DB2, C, Oracle, and HTML. Requires a Bachelor's degree in Engineering or related field plus four years experience. Full time. Please send resume to DNS - 532 Patterson Ave., Ste. 160, Mooreville, NC 28117. EOE.

Principal Consultant Software Engineer/Developer to analyze, architect, and design n-tiered products/applications using Java 2 Enterprise Edition Technology. Will utilize UML Modeling language in performing object-oriented (OO) analysis and application design. Will serve as Technical Lead in analyzing, architecting, designing and implementing applications involving Java Messaging Service (JMS) Technology over IBM's MQ Series. Will provide direction to Design and Development Team in adopting appropriate technologies, techniques, and methodologies, and work with team to re-engineer applications so that they use the appropriate technologies. Requires Bachelor's degree in Computer Science, Engineering, Mathematics or Physics plus five (5) years experience in Job Offered OR five (5) years experience in client/server applications development OR, in the alternative, Master's degree in Computer Science, Engineering, Mathematics or Physics, plus three (3) years in Job Offered OR three (3) years experience in client/server applications development. Candidate must also possess demonstrated expertise developing n-tier web-based distributed systems in Java and C++ demonstrated expertise integrating n-tier systems with back-end legacy systems. Salary: \$60,000/yr. M-F, 8AM-5PM. Send 2 resumes to Case #200200469, Labor Exchange Office, 19 Stanford St., 1st fl., Boston, MA 02114. EOE. Applicants must be eligible to accept full-time employment in U.S.

CONSULTING ENGINEERS. Support customers for the analysis and design problems in the fields of structure, fluid flow, heat mass transfer, and fluid mechanics. Develop, implement and maintain computer-aided engineering software in modeling cross-related fatigue and other structural, fluid flow, heat mass transfer and material processing problems. Use finite element coding, Patran PCL language, and FEA software systems (ANSYS/Pro/Engineering). Requires M.S. in Mechanical Engineering, experience or education must include numerical modeling of creep-related fatigue problems, as evidenced by Masters thesis work or at least an publication in this field. Finite element coding in the fields of structure, fluid flow and heat mass transfer; and use of Patran software, Patran Customization Language (PCL), and Finite Element Analysis (FEA) software systems. Must have current authorization to be permanently employed in the United States. Send resume to: Social Security Number in Siran Eng. Technolysis, Inc., 7168 Zionsville Rd., Indianapolis, IN 46268.

Prog. Analysts to analyze, design, maintain applications using C, Java, HTML, VBScript, ASP, MS SQL Rational Rose under Windows OS design, implement GUI and RDBMS using VB, Dev 2000, Oracle, MS Access, SQL Server. Requires B.S. or foreign equiv. in CS/Engg (any branch) & 2 yrs of exp. in the field. S.W. Engng or design, development, implement apps using C, C++, Oracle, SQL Server, MS Access on Windows, Unix, design, develop web apps using HTML, Java, ASP, JSP, CGI, JSP, require training and user support for the systems applications hardware/software to team and clients; debug and modify existing software. Requires M.S. or foreign equiv. in CS/Engg (any branch) with 1 yr exp. in the field. High salary. F/T. Travel involved. Resume to: Infosmart Technologies, 365 Leathamer ALpharetta, GA 30005.

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SYSTEMS ANALYST IT company requires System Analyst to develop full-life cycle software for large multinational telecommunication company, maintain repository conferencing data using Java, CORBA, C/C++, Rational Rose, WebSphere and ORACLE RDBMS. Perform graphical user interface creation, architecture upgrade, testing, and production support using Visual Cafe, Rational Rose (UML), Developer 2000, Optimizit, Windows 2000 and UNIX. Experience in audio and Net conferencing system is a must. Master's degree in computer science, engs, or related field and relevant experience. Send resume to Vivian Fernandes, Manager Resources, MBT International, Inc., 1155 Kelly Johnson Blvd., Suite 111, Office #11, Colorado Springs, CO 80920 or email to career@us.mahindratt.com

Opening for a Software Engineer to design, develop, test internal apps using VB, HTML/DHTML, ASP, JavaScript, VBScript, ActiveX, IIS, test under Windows OS; evaluate new methodologies and develop plans for improving existing systems; develop, customize and modify apps per user reqs; maintain documents and prepare programming specs; train users in application usage. Requires MS or foreign equiv. in CS/Comp Engg & 2 yrs exp in IT. F/T position. Salary commensurate with experience. Resume to: HR Learning Express, Inc., 25 Buena Vista Street, Ayer, MA 01432

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- QA resources & cover letter to itg-phoenix@spsheron.com

Programmer Analyst needed w/exp in s/w systems using COM/DCOM technology w/Object Oriented Programming languages using C++. Define & develop Interfaces using ATL. Develop User Interfaces w/VB, ASP, DHTML, & VBScript. Send resumes to: Advanced Computing Technologies, Inc., 3355 Breckinridge Blvd., Suite #128, Duluth, GA 30096. No in person resumes/interviews; only respond by mail.

Programmer Analyst needed by Lawrenceville, Georgia based Company - Bachelors degree with 2 yrs of experience in job. Exp. in Skill sets incl. Java, JSP, Servlets, JDBC, HTML, XML, UML, NT, Visual Basic 6.0, and ASP 1.2, Business Objects, Crystal Reports 6.0, SQL Server, JavaScript, XML, and C++. Fax resumes to: 770-963-1465.

Programmer-Analyst. Design, develop & implement application software using Oracle Developer, Reports, etc. Plan, develop and test programs. Req. 2 yrs. exp. in job offered or 2 yrs exp. in a related position with same duties & 2 yrs college ed. in Computer Science or a related field. EOE. Send resume to: America, 4640 Jefferson Davis Hwy #1, N. Augusta, SC 29841

Programmer/Analyst. Telecommunications co. Must have Bachelor's in related field or its functional equiv. in training, educ., and exp., and min 2 yrs exp. Analyze and design user requirements and objectives; design, develop, configure, and code applications, computer systems, and subsystems. Perform unit and system testing. 40 hrs/wk. SAM-SPM. Competitive salary. Send resume to: Global Connection, ATTN: HR, 3957 Pleasantdale Rd., Atlanta, GA 30340

S/W Graphic Designer to design, modify, maintain existing/new web sites using HTML, CSS, ASP, XML, Flash, under Mac and PC enviro. Create/revise conceptual designs and ideas into computer/images using Photoshop, Illustrator, Dream Weaver; create layouts based on layout principles, design concepts; conduct req. analysis/performance testing. Requires B.S. or foreign equiv. in CS/Graphic Design/Fine Arts with 2 yrs exp. Competitive salary, flt. travel involved. Apply to: HR, Mindspan Systems, Inc., 6050 Peachtree Pkwy, Ste 240-214, Norcross, GA 30092.

Seeking qualified applicants for the following positions in Memphis/Cordova, TN: Senior Programmer Analyst, Formulator/define functional requirements and documentation based on accepted user criteria. Requirements: Bachelor's degree in computer science, MIS, engineering or related field plus 5 years of experience in systems/applications development. Experience with either Java, JSP, EJB or J2EE, and writing applications that interface with relational databases (either Oracle, Sybase, SQL Server or Tada) also required. *Master's degree in appropriate field will offset 2 years of general experience. Submit resumes to Sbi George, FedEx Corporate Services, 1900 Summit Tower Blvd., Suite 1400, Orlando, FL 32810. EOE M/F/D/V.

Senior Web Developer. 2 yrs. exp. in web-based application development & programming. Must be able to design, develop, implement & test web-based computer applications/programs. BA/BS in CS, EE or closely related field. Relational database design, stored procedures, DTS packages, & data normalization. Visual Basic, Java Script, VBScript, ASP, XML, HTML, DHTML, COM/DCOM/MTS. Applications/Platforms/Protocols: SQL Server, IIS, FTP, STMP & SSL. Mail resume to: M. Barry, Memberhouse, Inc., 9 W. Broad St., Stamford, CT 06902.

Sr. Software Engineer needed w/exp to research, analyze, design, perform functional analysis, develop & maintain compliance web apps using VB, COM, COM+, MTS, ASP, XML & XSL. Design, develop & test comp. s/w systems in conjunction w/hardware product development using MS, Java Script, VB Script, HTML, Sybase & SQL Server. Provide tech support. Send resumes to: Fidelity Investments, HR, 82 Devonshire St., Boston, MA 02109.

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Programmer Analysts to analyze, develop, maintain software apps using Oracle Applications, Oracle, PL/SQL, Dev 2000, etc. under Windows/UNIX OS; conduct functional testing and debugging; perform data conversions, customize Forms/Reports using Oracle Applications standards; document, maintain & update development process. Require: BS or foreign equiv. in CS/Engg. (any branch) or related field & 2 yrs of exp. in IT. Travel involved. F/T position. Competitive salary. Resume to: HR, Quest America, Inc., 211 East Ontario Street, Suite 1600, Chicago, IL 60611

Programmer/Analyst: Central Illinois domestic livestock farm seeking candidate to design, develop and support the maintenance of a control system to monitor and analyze the behavior of domestic livestock. Must have Bachelor's degree and two years experience in Computer Programming or equivalent with biology minor. Practical experience with domestic livestock is preferred. Send resume to: Matti Shalev, Forrest Farms, 703 N. Center Street, Forrest, IL 61741.

Computers
SOFTWARE ENGINEER
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C&T Consulting is seeking a Software Engineer to develop student loan applications. Must have a B.S. in Computer Science or a related field and experience with J2EE/Java, XML, NCHLP CommonLine Version 4.85 and FFELP Student Loan Program. PeopleSoft, ADABAS/Natural, net opportunities also available. Send resume to: candi@ct.com and reference job#825. EOE.

Software Engineers to analyze, design, develop/customize business apps using Oracle Fin. and Manul. Apps, Oracle, SQL, PL/SQL, Dev 2000, Designer 2000 etc. under Windows, UNIX and Sun Solaris enviro; interact with end users, gather and document reqs; prioritize functional specs formulated from user reqs; evaluate product functionality and design to assure quality. Require: Masters or foreign equiv. in CS/Engg. (any branch)/Science/Bus. Mgmt. Travel involved. F/T position. Competitive salary. Resume to: HR, Quest America, Inc., 211 East Ontario Street, Suite 1600, Chicago, IL 60611

LEORNA Enterprises, a provider of software consulting services, seeks:
Senior Systems Integration Engineer, BS or equivalent in Computer Sci., Engineering or related + 6 yrs exp in SW enging, programming or related. Also 2 yrs exp in Windows & Unix systems admin; knowledge/background in: RDBMS: CGL and Perl, C++ or Java; background in power utilities/energy industry. Mail resume to: 2243 Shannon Dr., South San Francisco, CA 94080.

Mezztech Systems, Inc. is hiring all levels of software engineers. Send resumes to: Mezztech Systems, Inc., 1825 De La Cruz Blvd., Suite 201, Santa Clara, CA 95050. May be placed at unanticipated client sites nationwide.

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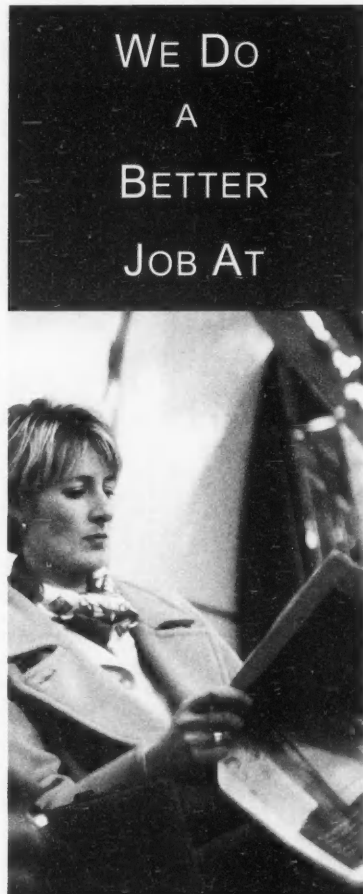
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- assess essential computing requirements for users in the Relief & Social Services Department;
- analyze, gather the required information and develop a high-level user requirements document;
- prepare a proposal, lead, negotiate its process of evaluation, review and monitor the development;
- arrange, supervise this development and make recommendations.

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Further information about this outstanding opportunity and how to apply are available from www.un.org/unrwa/emp.html. Applications close 25 April 2003.



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Networking Consultant for Chicago Office Design, dev. test & implement network solutions, analyzing client's business, in mergers, global office connectivity, branch connectivity & infrastructure using BGP Routing Protocol, Cisco Routers & switches. Must have BS and/or 2+ yrs. relevant exp. To apply send res./cov. ltr. to HR Manager, Affili Professional Services, 405 Lexington Avenue, 26th Floor, NY, NY 10174-2699.

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SYSTEMS ANALYST to develop, create and handle maintenance of programs; Develop and write codes in COBOL for new programs; Maintain programs on AS/400 for insurance premium finance companies using COBOL, CL, SQL, AS/400 Utilities, ASP, Java and AFP on AS/400 in a Windows NT platform. Requires B.S. degree in Computer Science or a closely related field with two years of experience in the job offered or as a Programmer/Analyst. Competitive salary offered. Send resume to Diane M. Wood, Automated Installation Systems, 955 Executive Parkway, Suite 201, St. Louis, MO 63141; Attn: Job Vac.

Software Engineer Norfolk, VA

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System Specialist - Resp for design, development, maintenance, & documentation of Web portal for Senior Business line of business. Resp incl. least analysis, sys design, & sys architecture; program in Java, JavaScript, C/C++, & Oracle; identify areas of risk & present mitigation plans; demonstrate expert understanding of sys design & development, technology support, & data processing standards; assess impact of technology support on sys. team's technical direction; provide consultative svcs for technical business opportunities; & train business units on new or changed products, processes, & svcs. Min. req's: Bachelor's in Computer Sci. Eng'g or rel. field + 2 yrs exp in job offered or 3 yrs exp as Programmer/Analyst or Software Engineer. Must have unrestricted authorization to work in U.S. M.F. 9AM-5PM, 40+ hrs/wk. Salary: \$80K-\$90K/yr. An EOE. Send 2 copies of resume to Case No. 200115678, Labor Exchange Office, 19 Stanford St., 19th Fl., Boston, MA 02114.

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Continued from page 1

Finance Law

at some companies. "We're looking at a whole series of governance and compliance issues related to IT for Sarbanes-Oxley," said David Klementz, chief financial officer at Progress Rail Services Corp. in Albertville, Ala.

For example, the act requires CEOs and chief financial officers to attest that annual and quarterly financial reports contain no material errors or omissions.

Jonathan Karpoff, a finance professor at the University of Washington in Seattle, said executives whose necks are now on the line at report-signing time will demand systems that are more timely and accurate. "What I'm hearing quite a bit is that firms can use Sarbanes-Oxley as an impetus to completely overhaul their control, monitoring and reporting processes," Karpoff said.

That's what's going on at Progress Rail. The supplier of railway products and services recently scrapped a combination of manual procedures and spreadsheets for consolidating the books of its subsidiaries and installed a set of financial-data integration and analysis software from SAS Institute Inc. in Cary, N.C.

Progress Rail is also using SAS Balanced Scorecard, a tool that gives Klementz near-real-time financial-performance metrics. That could tip him off to business problems that might otherwise go undetected until a quarterly audit is done, he said.

Those steps, which cost about \$500,000, are just the beginning, Klementz said. Sarbanes-Oxley and other new SEC regulations are prompting Progress Rail to do a top-

to-bottom examination of other systems that can affect its financial results, such as inventory control. In addition, the company faces higher labor costs.

"We're greatly increasing IT staff in order to make sure I'm comfortable that systems and

controls are in place," Klementz said, adding that he's also hiring IT and regulatory-compliance consultants.

Another key provision in Sarbanes-Oxley stipulates that outside auditors must examine and verify the effectiveness of a company's internal financial

controls. "Some aspects of that are typical (information systems issues), such as access controls, and we'll have to look at those things a little more strenuously," said Irving Tyler,



CIO IRVING TYLER warns that auditors will be making tough requests.

CIO at Quaker Chemical Corp. in Conshohocken, Pa.

Tyler warned other IT managers to brace themselves for tough requests from auditors. "I remember an auditor once recommending that we have 28-digit alphanumeric passwords that changed monthly," he said. "Things like that, which maybe in the past you decided not to pursue because you didn't see the justification, you might have to be more aware of now."

Some companies hope to avoid many compliance problems by outsourcing management of the issue. Hibernia Corp. in New Orleans out-sources all of its core financial systems. David Harrison, the bank's audit director, said he's relying on the outsourcer's legal staff to ensure that the systems comply with laws like Sarbanes-Oxley.

But Harrison acknowledged that the new law raises ques-

POTENTIAL IT IMPLICATIONS

The Sarbanes-Oxley Act

SECTION 103: Your auditor must (and therefore, you should) maintain all audit-related records, including electronic ones, for seven years. **Effective now.**

SECTION 201: Firms that audit your company's books can no longer also provide you with IT-related services. **Effective now.**

SECTION 301: You must provide systems or procedures that let whistle-blowers communicate confidentially with your company's audit committee. **No effective date set.**

SECTION 302: Your CEO and CFO must sign statements verifying the completeness and accuracy of financial reports. **Effective now.**

SECTION 404: CEOs, CFOs and outside auditors must attest to the effectiveness of internal controls for financial reporting. **No date set.**

SECTION 409: Companies must report material changes in their financial conditions "on a rapid and current basis." The act calls it "real-time disclosure" but doesn't define what that means. **No date set.**

tions he has to deal with, such as how to satisfy a requirement that corporate whistle-blowers be able to communicate confidentially with the company's audit committee. "I could set up telephone reporting or intranet reporting, but employees may feel that neither of

these provides sufficient privacy," he said. "We haven't decided one way or the other." ■

REGULATORY RISKS

CIOs themselves may face legal liability as a result of Sarbanes-Oxley.

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GEIS to Centralize Data for Product Design, Manufacturing

Looks to cut costs, improve efficiencies

BY JAIKUMAR VIJAYAN

GE Industrial Systems (GEIS), a \$5 billion subsidiary of General Electric Co., is implementing a major product life-cycle management (PLM) project that it hopes will reduce product development time, improve supply chain efficiency and cut costs.

The company last week announced that it is using PLM technology from MatrixOne Inc. in Westford, Mass., to develop a collaborative environment for planning, development, sourcing and program management.

When the project is fully implemented in about two years, more than 10,000 GEIS

employees worldwide will be able to log onto a central portal site to collaborate on a variety of activities.

"There are several business issues that we are trying to address," said Eric Reed, manager of the My Workplace portal

site at Plainville, Conn.-based GEIS. Centralizing the millions of engineering, manufacturing, marketing and project management documents associated with the products GEIS builds, and making the repository accessible from anywhere via the portal, will give the company greater flexibility in where it designs and builds systems, Reed said. Eventually, the environment will also be linked

with suppliers, he added.

Return on investment will come through faster product development times and greater efficiency, Reed said, declining to elaborate on the savings. The PLM system will allow for closer collaboration with GEIS suppliers, which can then be more directly involved in the product development process, he added.

The project hasn't been without its hurdles. For instance, migrating nearly 15 million product-related documents from legacy systems into the MatrixOne environment has been a time-consuming task, Reed said. Meeting the specialized document management requirements of the engineering community was especially challenging, as was getting user buy-in during

the early stages when there was little immediate benefit to demonstrate, he added.

A growing number of companies are looking into such PLM capabilities, said John Moore, an analyst at ARC Advisory Group Inc. in Dedham, Mass. "But we are not seeing quite as high an adoption as we had expected," Moore said. Part of the problem is the complexity involved in rolling out a PLM capability, he said. Large companies like GEIS with highly structured business processes stand a better chance of implementing PLM compared to those that don't, he added.

The customization involved in integration functions as varied as marketing, design and manufacturing groups can also be a huge challenge, Moore said. "PLM can also be somewhat of a difficult sell at this time" because of the cost associated with such projects, he added.

GEIS declined to disclose the cost of its project. ■

PLM TECHNOLOGY

FRANK HAYES ■ FRANKLY SPEAKING

Self-defeating Prophecy

LAST WEEK, RICHARD CLARKE had finally had enough. Testifying Tuesday before a congressional subcommittee, Clarke blasted the White House and the Department of Homeland Security for failing to keep cybersecurity at the top of their agendas. Clarke's the man who should know: Before he retired from the job in February, he was the federal government's infrastructure security czar and came up with the national strategy for protecting cyberspace.

Clarke has a reputation as a loose cannon who despises bureaucracy and loathes government regulation of business. He reportedly

quit in February because he wasn't offered a job in the new Homeland Security Department with as much clout as he had before. He's certainly no shrinking violet.

And when it comes to cybersecurity, Clarke decidedly is an alarmist.

But that's not exactly a problem when it comes to cybersecurity. Right now, cybersecurity could use a few more alarmists.

Think of the year-2000 problem circa 1995, back when CEOs were clueless and even many techies were in denial about what was needed. People with calm, reasoned explanations didn't get those folks off the dime. But Y2k alarmists did. Clear, rational arguments failed to get corporate boards to greenlight Y2k projects — but stories of impending catastrophe in the face of an immovable deadline got their attention.

Sure, the alarmists were wrong — but only because we made them wrong. The fear they generated created an opening for the pragmatists, who found ways to fix the problem. Call it a self-defeating prophecy if you like. But the threat was real. And if it hadn't been for the alarmists' willingness to spread that fear, they might well have been right predicting catastrophe after all.

Now imagine Y2k with no immovable deadline, with millions of unknown security holes to fix instead of a single well-understood two-digit-date bug, and happening in the middle of a recession instead of an economic boom. That's the cybersecurity problem today.

So we still need alarmists like Clarke. But this time around, they won't be nearly enough to get the attention needed to start the cybersecurity ball rolling.

There's too much inertia and not

enough urgency. There's no obvious deadline, no undeniable threat after years of viruses, worms and vandalism that have barely risen above the level of an annoyance for most organizations.

And there's no single problem to fix. The security holes and threats keep changing. Cybersecurity will always be a moving target.

And, not least, there's no money for a Y2k-style drive to solve the cybersecurity problem, and there may not be for years.

Which means there won't be a Y2k-style drive — not unless there's a major cybersecurity catastrophe. And that's exactly what everyone who understands the threat, from high-profile alarmists like Clarke down to the lowliest IT grunt, is trying to avoid.

So if we want to make our systems and networks and IT infrastructures secure, we'll have to do it the hard way.

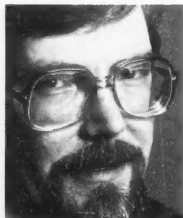
No big budgets. No massive push. No heroic efforts. No national agenda. Just an endless effort to improve security. That means constant pressure on vendors to clean up their products. And continuous education of users about the importance of following security rules. And a

deep-rooted understanding on the part of all IT people that security is a crucial part of every IT job — whether it has security in the title or not.

And yes, a few alarmists to keep blasting away at the people who still don't get it.

But we can't count on them for results. If we want to make cybercatastrophe another self-defeating prophecy, all we can do is keep improving IT security at every level, one bug and one threat at a time.

And hope that's enough. ■



FRANK HAYES, Computerworld's senior news columnist, has covered IT for more than 20 years. Contact him at frank_hayes@computerworld.com.

Try, Try Again

For two hours, support pilot fish tries unsuccessfully to help this user configure his firewall. The modern connects, but nothing comes through. "Eventually I discovered he had installed three different firewall products," fish grumbles. "He misconfigured the first one to block just about everything. He assumed that the firewall software wasn't working, so he installed another — and yet another."

Oops!

In order to nail down a big contract, this medical claims processing company adds a keyless entry system to beef up computer room security. But this pilot fish notes a flaw: "There was no lock on the door," he says. "To bypass the keyless entry system, all you had to do was turn the doorknob."

Yes, Connecting

After getting this administrative assistant's new laptop working, support pilot fish tries to show her how to download her mail. "She got really huffy with me — she was admin for the CIO, you know," fish says. "So I never finished her training." Two weeks later, admin complains that she hasn't gotten any e-mail. "I ask if there's a problem connecting to the network," fish says. "There's a moment of silence, then she says, 'Connecting?'"

The Save Button

Manager complains that none of her word-processing files are saving. Do you answer "yes" when you're asked if you want to save the document when you close Word? asks fish. "It never asks me that," man-



ager says. Uh, how do you close Word? "By pressing the orange button on the front of the computer," says manager. Groans fish. "That was the power switch."

But It Feels Faster

Executive grouses to IT pilot fish that his PC is too slow and needs upgrading. "The PC is less than a year old and runs fine, but it has a 15-in. monitor," fish says. He brings in a new 17-in. flat-panel monitor and a new mouse and keyboard. A week later, he hears from the exec again: "Thanks for the new computer. This one is twice as fast as my old one."

Clear Enough?

Your scrambled database is no problem, support pilot fish tells supply department chief. Where are your backup tapes? "They only gave me this one tape," he tells fish, "and I've been faithfully backing up the database every night on it for 18 months." When it fails, fish isn't surprised. "All of the oxide had worn away months ago," fish sighs. "He'd been backing his database up to an almost perfectly clear strip of plastic."



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Get Off the Backup Treadmill

Sony AIT data storage solutions help companies of any size automate tape backups, delivering real ROI through IT time savings.

Government regulators are requiring organizations from financial to health care to keep copious long-term records. Disaster recovery and business continuity requirements are more stringent than ever, as organizations try to prepare for the worst. And all the while, IT organizations are stretched to the limit, struggling to meet these basic day-to-day demands.

Clearly, it is imperative for any organization to routinely back up valuable data, but it's not imperative that they spend an inordinate number of IT hours doing it. Let's say it takes a single IT administrator 15 minutes to load, unload and check a backup tape, and that person has to deal with just two tapes each day. That's at least 10 hours of IT time per month spent juggling tapes—hours that could be dedicated to more strategic endeavors.

Automated tape systems can get organizations off the backup treadmill. Such systems allow you to consolidate multiple drives into one solution that can be loaded with enough tapes to handle backups for days or weeks. All the required backups and tape rotations are handled on a predefined schedule, without human intervention.

Once a luxury for only large organizations with big budgets and large IT departments, automated tape storage solutions such as those in the Sony Advanced Intelligent Tape™ (AIT) automation family are now cost-effective solutions for small and midsize organizations. Indeed, the fastest growing segment in the tape automation market is for systems with 20 cartridges or less. Even small companies, workgroups or departments with individual Digital Data Storage (DDS) tape backup systems can gain significant business benefits. Larger organizations can leverage the performance, capacity and reliability of a Sony AIT library to enable up to 30 days of unattended backup, boosting cartridge utilization and simplifying management.

Traditionally, many organizations use individual tape drives to back up critical servers, adding additional drives as demand dictates. Consequently, these tape drives are often deployed in a decentralized fashion, requiring that someone physically load fresh tapes into each drive daily or weekly, and to verify that backups complete successfully. With data volume doubling or tripling every year or two, it is difficult to keep up as the number of cartridges grows. Before long, multiple administrators are collectively spending an inordinate amount of time swapping tapes and attending to other mundane chores. This is particularly burdensome in systems with limited tape cartridge capacity.

While such organizations clearly need an automated tape solution, even those with only one tape drive can benefit. Single-drive tape autoloaders and multiple-drive tape libraries are integrated solutions that have space for anywhere from eight to hundreds or even thousands of tapes, along with a mechanism to automatically replace or rotate the tapes on a preset schedule.

When using an automated solution, an administrator loads the

tape drives with the appropriate tapes and uses backup software to specify when tapes should be switched, what files should be backed up and how often. Most systems notify the administrator if something is wrong, such as if a tape runs out of space. Otherwise, the administrator simply needs to check the unit at the end of the cycle, be it seven days or 30, and load new tapes. Consider the time savings compared with manually configuring the backup each day, swapping tapes and making sure each backup is complete. Then, consider that the time savings and increase in reliability are even more dramatic when it comes to retrieving data, when time is even more critical.

Sony AIT

Sony's AIT tape drives and libraries were designed from the ground up for automation, with a range of models that allow organizations to centralize their backups and upgrade existing library capacity. For example, Sony's LIB81, the first 1U autoloader in the industry, has one tape drive and capacity for eight cartridges. The flexible range of capacities supplied by Sony AIT-1, AIT-2 and AIT-3 tapes offer enough for a week's worth of backups, with room to spare for a head cleaning cartridge or a copy of a previous week's or month's backup tape. Sony's LIB162 is a larger unit with space for two tape drives and up to 16 individual tapes, all within a 2U rack-mountable design that can fit in a limited space. Its storage capacity of 0.8 terabytes (TB) native and 2.08TB compressed puts it among the leaders in terms of storage density per cubic foot.

In addition to rack-mountable storage systems, Sony has desk-side tape libraries that allow users to load up to 15 cartridges in a single removable magazine. This provides enough capacity for two weeks worth of tapes. Sony also offers 30-cartridge units that can provide up to one month or more of hands-free backups.

All of Sony's automated tape libraries include a number of important capabilities and characteristics, including:

- **Remote administration:** Sony's tape libraries all have the capability to be controlled and monitored from a remote location.
- **High reliability:** Sony AIT-3 drives are rated at up to 400,000 hours mean time between failure (MTBF) at 100% duty cycle—

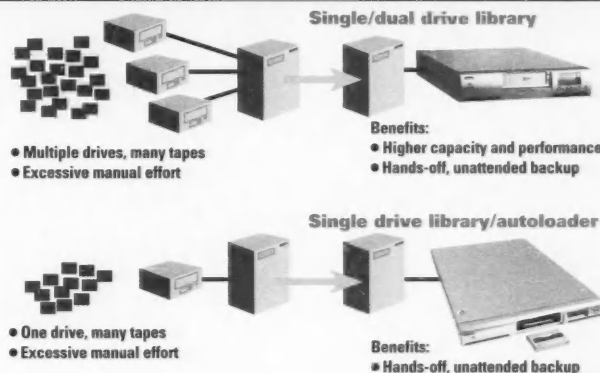
far exceeding most other types of traditional backup drives.

- **Fast file access:** Sony drives were the first in the industry to include the Memory in Cassette (MIC) feature, which provides 64K-bit flash memory within the tape cartridge to index information and the location of data on the tape. The feature speeds data access and retrieval, making AIT one of the fastest tape formats in terms of data retrieval.

- **Future growth path:** Currently in its third generation, AIT has a defined and proven roadmap that has seen performance and capacity double with each new generation. In addition, all three generations of AIT drives available today are both read and write backward-compatible.

- **Industry support:** AIT drives work with all major operating systems, including Windows, Linux and Unix, as well as with the majority of backup software packages, including Computer

Progression into Automation



Associates' CA BrightStor ARCserve, Veritas Software's Veritas Backup Exec and NetBackup, Legato Systems' NetWorker and IBM's Tivoli Storage Manager.

Sony's AIT automated tape backup solutions are also ideally suited to address the growing need for networked backup. Rather than installing and managing dedicated tape drives or libraries near each server, an organization can consolidate all storage functions and back up data from various servers across the network, further reducing deployment complexity and improving IT productivity.

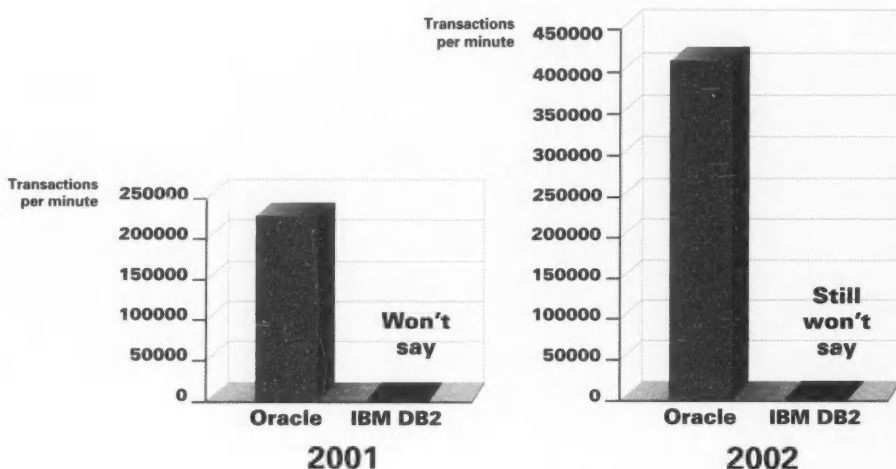
Whatever the configuration, high-speed, high-capacity AIT tape systems can reduce the pressure on your backup window by cutting down on the time it takes to complete a backup or restore. Automating your daily or weekly backups provides even more benefits—more reliable backups performed without manual intervention, freeing up valuable IT hours that can be spent on projects that contribute to the bottom line.

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220,807.27 tpmC, \$29.30/tpmC, available 4/13/01

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